

**The Pedagogical Aspect of Hisu Short and Long Interval
Training Effects on Endurance Performance: Athletics Project
Under 17 Sinana Woreda, Bale Zone, Oromia Region**

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This is certify that the thesis prepared by ShiferawGeremaw, entitled; *The Pedagogical Aspect of Hisu Short and Long Interval Training Effects on Endurance Performance* and submitted in fulfillment of the requirements for the Degree of Master of Education (Teaching Physical Education) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

The Pedagogical Aspect of Hisu Short and Long Interval Training Effects on Endurance Performance

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The purpose of the study was to investigate pedagogical aspects of short and long interval training effects in athletics endurance performance of Hisu Athletics project. Data were collected through questionnaire, interview, practical execution and observation checklist. Purposively 50 respondents participated as the source of data thus, 40 Athletes, 4 coaches, 4 Sinanaworeda and 2 zone youth and sport officers were participated in the study. To analysis the collected data, both qualitative and quantitative methods such as frequency counts, percentage, means, standard deviation, and t-test were on use respectively. There was a significant improvement observed in estimated VO2 max from 12MRT, 20m Shuttle run and RHR, Weight and BMI, 30m sprinting power test experimental and control group pre-post training tests mean values score due to the twelve weeks physical fitness training had positive effects on participants' endurance performance and also there is a problem of selecting athletes, the quality and pedagogical knowledge of coaches was not following scientific method of training, very low level of communication among stakeholders, a great constraint of facilities and equipment and shortage of encouragements for coaches and Athletes. To overcome these problems, the following recommendations have been forwarded: coaches should develop and learn how to prepare training level, the woreda and zone should find a way to upgrade the pedagogical knowledge of coaches, arranging trainings on how to prepare training level, all the sport leaders should work smoothly for the same goal, the woreda and zone youth and sport offices should work with difference stake holders to fulfill the constrains of resources.

Key Words: athletics, performance, team, sport, coaches, training federation, motivation

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LIST OF ACRONYMS

BMI- Body mass index

GAS- General Adaptation Syndrome

HR_{max}- Maximal Heart Rate

HIT- High intensity interval

HGH- Human Growth hormone

IAAF- International Association of Athletics Federation

IOC- International Olympic Committee

L- Level

MAS- Maximal Aerobic Speed

M- Mean

M.D- Mean Difference

MSFT- Multi-Stage Fitness Test

NASPE- National Association for Sport and Physical Education

Q- Question

RHR- Resting Heart Rate

S.D- Standard Deviation

S- Shuttle

SPSS- statistical package for social science software

Vo_{2max}- Maximal amount of oxygen inhaled during exercise

VVo_{2max}- Velocity of Maximal amount of oxygen inhaled during exercise

12MRT- 12 Minutes Run Test

Chapter One

Introduction

This chapter deals with the background of the study , the statement of the problem, objective of the study, significance of the study, delimitation, limitation of the study, definition of terms as used in the research document and organization of the study.

1.1 Background of the Study

Education is the most powerful instrument to overcome poverty and associated problems. Indeed it is an essential and individual power to reflect, make choice, seek voice in a society and enjoy a better life (World Bank, 2002). The sole responsibility of that teacher is to create a program that adheres to nationally set standards and benchmarks placed upon specific subject areas within a particular school system.

Physical education has been deemed an integral part of creating a well-rounded and holistic education. According to the National Association for Sports and Physical Education (NASPE), there are four main points that must be present for a quality education: the opportunity to learn, meaningful content, appropriate instruction, and student and program assessment (NASPE, 2012). NASPE further documents that by creating a quality education program, lessons help develop physical competence, health-related fitness, cognitive understanding, and positive attitudes about physical fitness. All of these qualities are the goals of new PE and one of the key qualities of new physical education and any successful academic program is the development of intrinsic motivation (Huitt, 2011).

Today, despite participation in sports activities are available and relatively cheap; however, few people would like to pay to physical activity and exercise. Although from the theoretical point, almost everyone knows that sporting activities can enhance physical health and also is an entertainment, but unfortunately from the practical point view, few are interested in regular exercises. Physical activity, fitness and relaxation have many benefits for the human body. According to the findings of Abdullah and Fauzee (2002), physical activity can be very effective in improving the human respiratory system, while

strengthening the heart muscle and increasing its volume is the benefits of physical activity. People with physical activity and those who exercise regularly are able to adopt an active lifestyle, have an attractive appearance and changes in mood and experience confidence.

Physical activity can be described as an activity that involves stimulus throughout the body that results human skeleton muscles contraction and increases energy levels. According to Silverman &Subramaniam (1999), student perceptions and positive attitudes towards physical activity is one the important elements in evaluating the success of a physical education curriculum. Develop and strengthen students' attitudes toward sports is the instructors and coaches key tasks. Because of this, athletics is an exclusive collection of sporting events that involves competitive running, jumping, throwing and walking; the most common types of athletics competition are track and field, road running, cross country running and race walking. The simplicity of the competition, and the lack of a need for expensive equipment, makes athletics one of the most commonly competed sports in the world.

Organized Athletics are traced back to the Ancient Olympic Games from 776 BC, and most modern events are conducted by the member clubs of the international Association of Athletics Federations. (Wikipedia, the free encyclopedia)

The word athletics is derived from the Greek word "Athlos" meaning "contest" or "task" initially. The term was used to describe Athletics contests in general i.e. sporting competition based primarily on human physical feats. In the 19th century in Europe, the term Athletics acquired a more narrow definition and come do describe sport involving competitive running, walking, jumping and throwing. Furthermore, foreign words in many Germanic and Romance languages which are related to the term Athletics also have a similar meaning. (Wikipedia, the free encyclopedia)

Athletics is one of the purest of all sports, relying solely on the strength of human body rather than their technological implements to improve performance. When we mention sport and Ethiopia, the large number of first- class distance runners' immediately comes to our mind. In fact, at this stage on could safely and justifiably come to an agreement

that Ethiopia has some of the best middle and long distance runners in the world. Accordingly, the New York Times called Ethiopia “running Mecca” due to its historical successes they took the athletes program, in which it also took 5th place in the world ranking during the Olympic champion at Beijing (International Olympic committee, 2010).

Ethiopian first participated at the Olympic Games in 1956, and has sent athletes to compete in every summer Olympic Games since then, except for the 1976, 1984, and 1988 Games. Ethiopian Athletes have won a total of 38 medals, all in Athletics. National Olympic committee of Ethiopia was founded in 1948. (<http://en.wikipedia.org>)

Fitness training for most people comprises a workout of continuous exercise at a constant intensity. This type of training is very effective but, to propel yourself to the next level of fitness, you need to incorporate interval training into your fitness training regimen. You will burn more calories, increase your speed, strength, endurance, motivation and overall athletic performance.

The concept of interval training has been around for years as the basis for athletic fitness training routines. Originally called Fartlek, it combined alternating short and fast bursts of intensive exercise with the slower, easier activity of continuous work. Fartlek training was a deliberate attempt to complete more work than continuous training by increasing the intensity of workouts. Regular endurance training improves performance during tasks that rely mainly on aerobic energy metabolism, in large part by increasing the body's ability to transport and utilize oxygen, and enhancing the capacity for the oxidative metabolism of substrates by working skeletal muscle (Saltin & Gollnick, 1983). While less widely appreciated, high-intensity interval training (HIIT) is a potent stimulus to induce physiological adaptations that resemble, and indeed may be superior to, changes typically associated with traditional endurance training (Kubukeli et al., 2002; Ross & Leveritt, 2001).

Indeed, highly-trained endurance athletes have long incorporated HIIT as an integral component of training programs designed to maximize performance (Laursen & Jenkins, 2002). Recently, short-term studies lasting up to several weeks in healthy persons of

average fitness have established that HIIT per se is a potent stimulus to induce physiological adaptations that resemble changes typically associated with traditional endurance training, despite a lower total exercise volume and reduced training time commitment (Burgomaster et al., 2005; Gibala et al., 2006; Little et al., 2010). This brief review highlights recent work that sheds new light on the potency of low-volume HIIT to induce rapid physiological remodeling and enhance the capacity for performance during tasks that rely mainly on aerobic energy metabolism.

For a more comprehensive analysis, as well as the potential application of HIIT to different populations, (Gibala et al., 2012, 2014) and others, including work that has specifically focused on those at risk for, or afflicted by, cardio metabolic disorders (Kessler et al., 2012; Weston et al., 2014). With regard to practical applications and training prescription, two other recent reviews (Buchheit & Laursen, 2013ab) consider in detail various aspects of HIIT programming, with a particular focus on athletic performance.

From this notion, the researcher argument on the fact that Ethiopia track and field event athletes; the pedagogical approach of Hisu short and long interval training to improve endurance performance athletics under 17 project; would repeat what has been achieved by track event athletes; provided that the journey of trainee athletes preparation is conducted under well organized and equipped athletics project, worked together in harmony with all stakeholders

1.2 Statement of the Problem

Now, a day's athletics is the most popular game that is practiced in all nations of the world. It's simplicity of the competition and cheaper equipment's make athletics popular all over the world. And also, it is a dynamic sport that needs understanding and solving problems of training to create performance improvement to compete in a frequent changing environment. But the case of Hisu Athletics project under 17 the pedagogy of short and long interval training to improve endurance performance of the team failed to show the expected level of the performance progress for some years. To understand the problem of the team the result that the athlete has registered in Bale zone athletics

championship competition most of the time shows that the team of athletics is not fit for the competition organized at Zone level.

Even though, there are numerous effects affecting performances of the athlete, the researcher were to see some effects contributing to the decline of the SinanaWeroda athletics team aerobic performance. These are especially pedagogical knowledge of the coach, athletes, Zone athletics federation and sport commission relationship, facilities and equipment, motivation and selection criteria of the athlete etc...

Moreover, the purpose of this study is to deal with those problems that found at Hisu Athletics project under 17 in focus is the pedagogical of short and long interval training to improve endurance performance forward possible solutions.

1.3 Research Questions

In order to meet the objective of the study the following research questions are addressed as a guide for treating the problem.

1. In what way the pedagogy and coaching is practiced?
2. Is there good integration among the coach and trainee?
3. To what extent facilities and equipment are available?
4. Do athletes have motivation to get involved in the training?

1.4 Objective of the Study

1.4.1 General Objective

The general objective of the study is to evaluate the methodological approach and training in endurance performance of Hisu athletics project under17 Oromia region team and to find out the causes of poor performance, recommend possible solutions and to minimize factors that affect the Woreda athletics team aerobic performance.

1.4.2 Specific Objectives

The specific objective of the study is to:-

- Identify what pedagogical knowledge and skill of coaches problems exist in the process of coaching under 17
- Assess the source of problem Hisu athletics project under17-Age team athletics aerobic performance.
- Suggest solutions for the challenges of Hisu athletics project under17-Age team athletics aerobic performance.

1.5 Significance of the Study

The study would support and enrich the endurance performance of the Hisu athletics project under17 Bale Zone, Oromia regional state athletics team. To this end, the significance of the study is to:

- Identify the skill and pedagogical knowledge of the coach effects of Hisu athletics project under17 Bale Zone athletics team performance.
- Indicate the importance of qualified coach, facilities and equipment, selection criteria of athlete and smooth relationships among Woreda sport administrators.
- Provide suggestions that would contribute to the development of coaches performance both coaching science and pedagogical knowledge in the Woreda.
- Provide specific information for those who are interested in carrying out research on related issues.

1.6 Delimitation of the Study

The scope of the study is delimited more specifically to the Hisu athletics project under17 Bale Zone, Oromia Regional state, where the subject of the study are found. Hence, conclusions reflect only what the pedagogical and training of short interval training and long interval training effects on athletics endurance performance situation of the Hisu athletics project under17 Bale Zone, Oromia regional state athletics looks like in these settings.

1.7 Limitation of the Study

As the researcher happen to learn from the experience of some other countries, an estimable number of studies have been conducted in various parts of the world on athletics performance. The instruments specially prepared for the study were based on certain rationales. In order to have firsthand about the coach development and performance development, short interval training, continuous training and observation follow up are very important. Any research activity requires varied, relevant, updated and accessible sources of data. However, the effort of the researcher was challenged by shortage of these sources. In addition, the absence of adequate and comprehensive domestic research work in the area under study also counts against the attempt of more substantial research work. Since the study aid only focuses on the Hisu athletics project under17 Bale Zone, Oromia regional state athletics team, the findings which would have been the basis for fair generalization were not also free from limitations.

1.8 Operational Definition of Terms

The following key terms were used throughout this document and ensure clarity of meanings and usages the terms are defined below:

Athletics – is a competitive physical activity made up of several separate events, based on the natural movement of running, jumping and throwing.

Coach – is a professional head of a team who is responsible for the preparation and performance of a single athlete or a team as a whole.

Coaching- an instructor/ a tutor who gives private or specialized teaching.

Teaching-imparts knowledge to or instruct in how to do something, especially in a school or as part of a recognized program.

Federation – is an organization that governs and directs different athletics events.

Motivation – is the direction and intensity of one's effort.

Performance – is observable behavior of athletes in playground.

Team – is the collection of individual who has the same goal and objective.

Sport- an activity involving physical exertion and skill in which an individual or team competes against another or others for entertainment.

1.9 Organization of the study

The current study is organized into five chapters. Chapter one deals with the background, statement of the problem, research questions, objectives of the study, significance of the study, delimitation and limitation of the study and definition of terms as used in research documents. Chapter two consists of related literature appropriate for the research topic. Chapter three consist research design and methodology. The fourth chapter includes presentation, analysis and interpretation of the data. The final chapter includes summary, conclusion and recommendation.

Chapter Two

Review Literature

2.1 Performance

Athletics performance is the manner in which sport participation is measured. Sport performance is a complex mixture of biomechanical function, emotional factors, and training techniques. Performance in an athletic context has a popular connotation of representing the pursuit of excellence, where an athlete measures his or her performance as a progression toward excellence or achievement. There is an understanding in sport that athletes interested in performance tend to the competitive or elite level; athletes interested in simple participation, for broader purposes such as fitness or weight control, are most often recreational athletes who do not set specific performance goals (www.worldsport.com).

2.2 Training theories and methodologies

The human body is structured in such a way that it maintains relatively stable internal physiological conditions, or homeostasis. Blood volume, hematocrit, arterial pressure and core temperature are among the most important physiological indicators of homeostasis. When this balance is disturbed, the body reacts acutely in an attempt to preserve homeostasis and, if the 'disturbance' continues, it adapts its functions to a higher level. Physical training aims to cause such an imbalance in the body over a period of time, while training theory and methodology deals with the understanding of the cause and optimization of training results.

The theoretical background of training originally comes from the work of Dr. Hans Seyle, who first introduced the General Adaptation Syndrome (GAS) theory in 1956. In his model, Seyle suggested that the body responds to stress in three different stages. The first stage, or 'shock stage', is when the source of biological stress is identified by the body, which responds to this change and tries to overcome the imbalance caused by the

stressor. As the stressor persists, physical and mental performance is reduced below baseline levels.

In terms of training, this stage refers to the introduction of a training program where the individual experiences soreness, stiffness and tiredness due to the initial 'shock' caused by the exercise. The second stage of the GAS is termed the 'resistance stage' which starts as soon as the stressor is removed. During this stage, the human body recovers from the temporary imbalance and adapts at a higher level of performance to compensate for the increased demands. These two stages are natural responses to the stressor and have positive effects on the body.

The third stage is referred to as the 'exhaustion' or 'fatigue' stage, and can be reached when the stressor is of great longitude or magnitude, and the body does not have sufficient time to adapt. Performance optimization is the result of long term, demanding and well- structured exercise training. For the athlete to gain maximum benefits from exercise, several factors involved in the adaptation mechanism have to be considered. These factors include overload, specificity, individual differences and reversibility. Overload refers to the intensity and duration of the training stimuli. Exercise training has to be sufficient in its intensity and duration to activate the adaptation mechanism and bring about changes in structural, physiological, neural, psycho- logical and endocrine functions. If the training exercise does not stress the body sufficiently, no adaptation occurs.

On the other hand a very high stress can lead to injury or over-training; hence, any new increase should be followed by an unloading phase during which the body relaxes, adapts and prepares for a new increase in load (Harre 1982). Not every type of exercise is appropriate for all sports. The performed exercise has to be sport-specific and focus on the muscles and organs stressed during the actual competition. Low-intensity strength training, for example, does not prepare the muscle for the demands of competition in which high muscle forces are required, while speed increases should be possible only if training loads are low but with high-velocity muscular actions.

A training program has also to be planned according to the training principle of individuality in order to meet the needs of each athlete.

Inter-individual variation in responses to exercise and adaptation rate are partially because of genetic differences. The relative predominance of fast- or slow-twitch motor units in muscles and endocrine factors determine to a great extent the level of adaptation. The competition level can also affect individual training programs, particularly in relation to overall length, which may extend from 8 to more than 30 hours per weekly.

2.3 Training for Endurance Performance

Training intensity over the years different sports have adopted different definitions and terminology to categorize the various types of training employed within a training program. Much discussion has occurred, and debate still continues, regarding the definition and number of training zones, the terminology used, the physiological markers that should be assessed while monitoring training intensity and the appropriate periodization of training zones. Wide-reaching review articles (Pate & Branch 1992) broadly categorize training associated with endurance performance into three distinct zones:

- Long slow distance;
- Moderate-duration, high-intensity training;
- Short-duration, very high-intensity training.

In addition to the basic training zones, a proportion of an endurance athlete's time will be devoted to strength training and flexibility. The most effective training mode is the intermittent interval training, which results in increased accumulation of lactic acid. Short rest intervals of up to 2 minutes are provided between the activities. This type of training allows the athlete to perform exercise of an increased total duration at an intensity that could not be tolerated for a prolonged period. Anaerobic endurance training (short-duration): The repetition of short- duration maximal intensity exercise bouts (15 seconds) with a work: rest ratio in the region of 1:10. This type of training increases the capacity of the ATP-CP energy pathway and enhances muscular power. Anaerobic endurance training (long- duration): The repetition of maximal intensity exercise of 1–3

minutes duration with a work: rest ratio in the region of 1:4. This type of training places significant demands on the anaerobic glycolysis energy system.

2.4 Differences between Teaching and Coaching

The power of the coaching model, here are a few differences:

1. Coaches thinking about teachers and instruction. Teachers' thoughts all about students and learning.
2. Coaches much more aware of motivation and see when students were bored. Whereas teachers, more inherently interesting and harder time seeing students the boredom.
3. Coaches able to plan amazing lessons and do an hour of prep for every hour of teaching. While teachers teaching six subjects with forty-five minutes of prep a day and much more challenging, lessons feel less graceful, because they are less sophisticated.
4. When coaches coached saw classes. When teachers teach saw students, know their names and stories.
5. When coaches coaching, they had the picture in mind, saw entire schools and experienced the school culture as an outsider. As a teacher, see the world through narrow-minded, even though accurate, lens of classroom.
6. When coaches coached, they could refine lessons by teaching them in different classrooms with different variables. When teachers teaching, they don't have that chance at refining what he/she doing.
7. When coaches coached, they were a visitor in someone else's space. They had little control over classroom culture and climate. If a kid misbehaved, it didn't feel personal. When teachers teaching, it's part of a community.
8. When they were a coach, they couldn't see the difference was making. They knew that coaches mattered, but any influence they had was twice removed from the actual students. As a teacher, it's reminded of the power of education and my role within it.
9. When they was coaching, well aware of my strengths. They put on a robe of false humility and self-deprecation, but they didn't see my faults as easily. As a teacher, much more aware of my limitations and mistakes.

10. When they were coaching, thought about the teacher in terms of planning, instructing and assessing. When they teaching, it's reminded of all the other things we are asked to do, from picture day to the stack of forms to the bullying we report to the meetings we attend.

In summary the differences between teaching and coaching occur mainly in the depth of knowledge transfer and the focus of that transfer. There are also differences between the level of qualification and the focus of those qualifications between teachings and coaching, as well as the financial reward for each. However, the main similarities lie in the fact that teaching and coaching are both essentially athlete-centered and excellent communication and planning skills are need for both. Teaching and coaching are, in my view, both worthwhile and rewarding, and I am proud to do both.

2.5 Planned Performance Training

John Amneusetal (1995) describes that, the primary purpose of training is to improve and plan the performance of the athlete. The systematic application of skill instruction, biomechanics, and the principles of training to the development of track and field athletes is planned performance training. Planned performance training seeks to achieve maximum improvement in performance and structured so that peak performance occurs at predetermined moments within the competitive season. That, after all, is the point of competition. Without such planning, the training of the athletes becomes haphazard and good results become a matter of happenstance rather than planning and prediction.

The first requirement of successful planned training is assessment. A coach must evaluate the athletes and their abilities, the level of competition and the time available for training and competition. From this evolution, the objectives and goals for individuals and the team are defined. A set of expectations for the athletes establishes direction and purpose for their efforts. Expectations frame the goals the coach and the athletes will have for the season. At the same time though, goals must be realistic and open ended. Goals that are too grandiose only serve to discourage performance. Goals that do not evolve inhibit the unseen abilities of the athlete. Goals are most often achieved when accompanied by the true expectation of success.

The second element of planned performance training is planning. The coach needs to create an overall plan for training the team and individuals. This plan should apply the fundamental principles of training to the expectations and goals that have been defined. If anything, this basic plan constitutes the foundation upon which the coach creates the structure of competitive success. Coaching without a plan for the season or phase of training is like navigating unfamiliar territory without a map. Too often athletes are kept ignorant of the course of their training. How can they possibly prepare mentally to train with commitment if their coaches do not demonstrate such preparation? Of course, training must be adapted to circumstance, but without a strategy athletes are unlikely to experience success. Once a plan is made, the construction and execution of the daily, weekly, and cyclic training component becomes the third element of planned performance Principles and methods of Training. This constitutes the body of the training design. The fourth step in the process of planned performance training is evaluation. Evaluation is not a final step, but an ongoing process that allows the coach's strategy to adapt to the changing demands of any training situation. Evaluation provides measurement and feedback that allows the coach and athlete to evolve over the course of the season.

2.6 Developing a Coaching Philosophy

The two most important considerations in developing a personal coaching philosophy are determining coaching objectives and coaching style. Coaching objectives could include improving the program's win/loss record, winning a league title, placing among the top five teams in the section or state championships, showing significant individual and team improvement, making the program fun for all the athletes, or teaching the athletes to compete well (Johan Amneusetal, 1995).

High school coaches often believe their first responsibility is to produce winning teams; however, winning should not be the single measure of success for the coach or the athletes. An overemphasis on winning can produce such negative responses in young athletes as anxiety, fear of failure, reduced self-esteem and a loss of motivation. Coaching success should be measured in a variety of ways other than a state ranking, win/loss record, or a high place in the league meet. The number of athletes attracted to the

program, the athlete's enthusiasm for track and field, the improvement the team shows through the course of the season and the amount of parental/community/ school interest and support generated for the program are equally important measures of success.

Winning the majority of the meets during the season does not necessarily make any coach a good leader or positive role model for young athletes. A coach's actions speak louder than words, especially during competition. Coaches must teach respect for the rules, the opponents and the Judgment and integrity of officials by example through their behavior (Johan Amneusetal, 1995).

2.7 Interval Training

Interval training is the ultimate cardiovascular workout. Just by practicing interval training once a week, you will be able to take advantage of a number of benefits, from more effective oxygen intake to a slower heart rate Gray, S. (2011).

2.7.1 Interval Training is similar to your everyday activities

One of the greatest benefits to interval training is the similarity to regular activities that the average person performs on a daily basis. Most people are not focusing on working at a moderate to high level of intensity for long periods of time through the day. It is natural to take breaks and rest between activities, especially when such activities are so intense. Interval training is an excellent way to prepare your body for the sudden bursts of stress or activity that everyone experienced from time to time.

2.7.2 Interval Training improves oxygen utilization

The body's ability to make use of oxygen can be greatly improved through the practice of interval training. Oxidative capacity is how much oxygen muscles can use during aerobic exercise. If your muscles are not able to pull the oxygen from the blood stream, then it makes no difference if your lungs are working sufficiently.

The measure of oxidative capacity is known as VO₂ max, which is the maximum amount of oxygen the muscles are able to take from the blood and use. Studies indicate that interval training significantly increases the ability to use oxygen by as much as 100%.

2.7.3 Interval Training saves time

You do not have to spend countless hours at the gym or running at high speeds for a couple of hours to take advantage of the benefits of interval training. With interval training, you can accomplish in just four minutes the same benefits as you would get from an hour-long run at 65% maximum capacity.

Martin Gibala is the chairperson for the Department of Kinesiology at McMaster University of Hamilton, Ontario, Canada where extensive research has been performed on short-burst, or interval training. Along with his colleagues, Martin Gibala published a study a few years ago that found that interval training for one and a half hours each week, including breaks for rest, produced the same results over a six week period as regular endurance training for close to five hours every week.

2.7.4 Interval Training improves the ability to burn fat

The muscle carbohydrate reserves, glycogen, is almost exhausted thorough interval training. It may seem a little backwards to think that improved fat burning is one of the many benefits of interval training because carbohydrates are used as the main source for fuel.

On the contrary, once the glycogen reserves have been exhausted replacement is necessary through the fuel source fat. Hours after you have completed your workout, you will continue to reap the benefits of interval training because your body will use up fat replacing the depleted glycogen.

2.7.5 Interval Training is an excellent way to train for any sport

The ideal way to train for any sport is with interval training. You can train for anything through the benefits of interval training, from a short sprint to a marathon.

Changing how much time you spend resting versus the time you spend working out at maximum capacity will effectively train the various energy systems necessary to dominate your favorite sport.

2.7.6 Interval Training increases human growth hormone production

With interval training, production of the human growth hormone, also known as somatotrophic, is increased. Human growth hormone (HGH) is required to repair damage to tissues and build muscle.

Interval training has even been proven to increase the production of human growth hormone in older people. Proper HGH production aids in recovery following your workouts, ensuring you will be ready for your next session.

2.7.7 Interval Training improves heart efficiency

The amount of blood that is pumped throughout the body can be improved in two different ways. First of all, there is the amount of blood expelled by the heart. Secondly, heart rate, which is the rate that the heart pumps blood.

Research shows that fit individuals have a lower than average resting pulse. Interval training makes the heart stronger, making it possible for more blood to be expelled with each pump. This means that your heart will not have to pump as often, thus reducing your resting heart rate.

2.7.8 Interval Training reduces insulin dependency

Essentially, the body uses insulin to transport sugar to cells in the form of glucose to be used as energy. Exercise at a high level of intensity causes the body to produce lactate, which is a good thing. Lactate is transported to cells much easier than glucose and it does not require any insulin to do so. Lactate is then converted into pyruvate, a major chemical that is used to produce energy quickly. The benefits of interval training positively affect the lives of both diabetics and non-diabetics alike.

Generally, Interval training has great abundance and is not only a fun way to lose weight, but also a quick way. When you burn fat both during as well as after your workout, as with interval training, your workouts are more effective. A more effective workout will save you time, giving you the awesomely fit body you want in half the time. In addition, your overall fitness level will improve, your stress level will be reduced, your immune system will be stronger and you will be healthier than you ever thought was possible.

2.8 High Intensity Interval Training

The role of high intensity interval training as opposed to, or in conjunction with more traditional methods of developing endurance is an area of interest for many researchers in individual as well as team sports (Billat, 2001, Franch, Madsen, Djurhuus & Pedersen, 1998).

This interest may be due to the limitation in simply increasing training volume, such as distance covered, on athletes who already have a high training load. Taking account the overabundance of training needs to athletics. High Intensity Interval Training (HIIT) warrants investigation for improving aerobic power in a time efficient manner.

2.9 Maximal Aerobic Speed Training

Maximal Aerobic Speed (MAS) training should be considered as a method of increasing or maintaining aerobic performance for athletics. Specifically, MAS training involves training at intensity near to, equivalent to, or higher than the speed attained when the participant reached VO₂max (Midgley & McNaughton, 2006). For instance, if a distance runner achieved his VO₂max at a running speed of 18 km.h⁻¹, running at a speed higher than 18 km.h⁻¹ or higher, would be considered MAS training.

A number of different methods exist to determine VO₂max which can be used to determine MAS. These may include both field & laboratory tests. Although laboratory tests using gas analysis is generally considered a gold standard for determining VO₂max, certain field tests have been shown to be effective at estimating VO₂max indirectly. MAS can be estimated as the last complete speed achieved in an indirect VO₂max test (Berthoin et al 1996).

The intensity of MAS generally approaches volitional fatigue. It has been suggested that training at intensities greater than 90% of VO₂max can elicit the greatest gains in aerobic power (Wenger & Bell 1986).

The greater the time spent training at or around VO₂max, the greater the adaptation and improvement in aerobic power (Tabata, Nishimura, Kouzaki, Hirai, Ogita, Miyachi & Yamamoto, 1996) of the research on MAS training has varying results. A supra-maximal interval training session was compared with regular endurance training methods to ascertain the effect on anaerobic capacity and aerobic power. Both training regimens resulted in significant and similar increases in VO₂max. The intensity of the regimen required athletes to perform at an intensity that equated to their VO₂max, which, in turn, elicited a training effect and increased VO₂max significantly.

Earlier research showed that 120% of MAS in short intervals elicited the longest performance a VO₂max (Dupont et al. 2003). This protocol lead to improvements in the velocity achieved at VO₂max. Interestingly, this study was conducted during the season. Improvement in team performances were observed during the course of the study. In addition, other physiological needs, such as speed and leg power were maintained during the study. This shows that physical characteristics such as aerobic power and MAS can be improved during the season without any decreased in performance or other physiological areas of importance.

In partial contrast, a study compared long interval training (and shorter high intensity interval training (16.5 km/h, 4 to 6 x 4 minutes with 2 minutes recovery) and shorter intervals (20.4 km/h, 30 to 40 x 15 seconds with 15 seconds of recovery) (Franch et al .1998). All two regimens lead to improved aerobic power. However, long interval training groups improved significantly more than the shorter higher intensity training group.

2.10 Performance Evaluation Tests

Performance is an assessment of how well a task is executed and the success of a training program is largely dependent upon satisfying the performance aims associated with it. <http://www.brianmac.co.uk/eval.htm>

2.10.1 How can performance be monitored

Testing and measurement are the means of collecting information upon which subsequent performance evaluations and decisions are made.

2.10.2 What is the evaluation process

The whole measurement/evaluation process is a six stage, cyclic affair, involving:

- ❖ The selection of characteristics to be measured
- ❖ The selection of a suitable method of measuring
- ❖ The collection of that data
- ❖ The analysis of the collected data
- ❖ The making of decisions
- ❖ The implementation of those decisions

All of the above stages should be completed with the athlete - especially the analysis of the collected data and making decision of an appropriate way forward.

2.10.3 What are the requirements of a test

In constructing tests it is important to make sure that they really measure the factors required to be tested, and are thus objective rather than subjective. In doing so all tests should therefore be specific (designed to assess an athlete's fitness for the activity in question), valid (the degree to which the test actually measures what it claims to measure), reliable (capable of consistent repetition) and objective (produce a consistent result irrespective of the tester).

In conducting tests the following points should be considered:

- ❖ Each test should measure ONE factor only
- ❖ The test should not require any technical competence on the part of the athlete (unless it is being used to assess technique)
- ❖ Care should be taken to make sure that the athlete understands exactly what is required of him/her, what is being measured and why
- ❖ The test procedure should be strictly standardized in terms of administration, organization and environmental conditions

2.10.4 What are the benefits of testing

The results from tests can be used to:

- ❖ predict future performance
- ❖ indicate weaknesses
- ❖ measure improvement
- ❖ enable the coach to assess the success of his training program
- ❖ place the athlete in appropriate training group
- ❖ motivate the athlete

Tests additionally break up and add variety to the training program. They can be used to satisfy the athlete's competitive urge out of season. Maximal tests demand maximum effort of the athlete so they are useful at times as a training unit in their own right.

2.10.5 What factors may influence test results

The following factors may have an impact on the results of a test (test reliability):

- ❖ The ambient temperature, noise level and humidity
- ❖ The amount of sleep the athlete had prior to testing
- ❖ The athlete's emotional state
- ❖ Medication the athlete may be taking
- ❖ The time of day
- ❖ The athlete's caffeine intake
- ❖ The time since the athlete's last meal
- ❖ The test environment - surface (track, grass, road, gym)
- ❖ The athlete's prior test knowledge/experience
- ❖ Accuracy of measurements (times, distances etc.)
- ❖ Is the athlete actually applying maximum effort in maximal tests
- ❖ Inappropriate warm up
- ❖ People present
- ❖ The personality, knowledge and skill of the tester
- ❖ Athlete's clothing/shoes
- ❖ Surface on which the test is conducted
- ❖ Environmental conditions - wind, rain, etc.

2.10.6 What should be recorded

The information to be recorded falls into two broad categories: -

- ❖ The day-to-day information from training
 - ✚ State of the athlete (health, composure)
 - ✚ Physiological data (body weight, resting heart rate, etc.)
 - ✚ The training unit (speed, speed endurance, strength, technique)
 - ✚ The training load (the number of miles, the number of sets and repetitions, the number of attempts)
 - ✚ The training intensity (kilograms, percentage of maximum, percentage of VO_2)
 - ✚ The prevailing conditions (wet, windy, hot etc.)
 - ✚ The response to training (the assignments completed, the resultant heart rate recovery, felt tired, etc.)
- ❖ Information that measures status. This can take the form of a test. If the test is repeated throughout the program, it can then be used as a measure of progress within the training discipline. Examples of such tests are:
 - ✚ Time trials - speed, speed endurance, endurance
 - ✚ Explosive strength - power bounding, vertical jump, overhead shot putt
 - ✚ Event specific

2.10.7 How can we make tests more reliable and valid

- ❖ Use competent and well trained testers
- ❖ Equipment should be standardized and calibrated regularly
- ❖ Each test should measure only one factor
- ❖ Care should be taken to make sure the athlete understands exactly what is required of them
- ❖ The test procedure should be standardized in terms of administration, organization and environmental conditions
- ❖ The test should be designed so that it can easily be repeated by another trained tester
- ❖ The test should be fully documented so that it can be administered in exactly the same way the next time it is conducted

2.11 VO₂ max

Fitness can be measured by the volume of oxygen you can consume while exercising at your maximum capacity. VO₂ max is the maximum amount of oxygen in milliliters, one can use in one minute per kilogram of body weight. Those who are fit have higher VO₂ max values and can exercise more intensely than those who are not as well conditioned. Numerous studies show that you can increase your VO₂ max by working out at an intensity that raises your heart rate to between 65 and 85% of its maximum for at least 20 minutes three to five times a week. A mean value of VO₂ max for male athletes is about 3.5 liters/minute and for female athletes it is about 2.7 liters/minute. (<http://www.brianmac.co.uk/VO2max.htm>)

2.11.1 Factors affecting VO₂ max

The physical limitations that restrict the rate at which energy can be released aerobically are dependent upon:

- ❖ The chemical ability of the muscular cellular tissue system to use oxygen in breaking down fuels
- ❖ The combined ability of cardiovascular and pulmonary systems to transport the oxygen to the muscular tissue system

There are various physiological factors that combine to determine VO₂ max for which there are two theories: Utilization Theory and Presentation Theory.

Utilization theory maintains that VO₂ max is determined by the body's ability to utilize the available oxygen whereas Presentation Theory maintains it is the ability of the body's cardiovascular system to deliver oxygen to active tissues.

A study by Saltin and Rowell (1980) concluded that it is the delivery of oxygen to active tissues that is the major limiting factor to VO₂ max. A study by Gollnick et al. (1972) showed a weak relationship between the body's ability to utilize the available oxygen and VO₂ max.

2.11.1.1 VO₂ max and age

As we get older our VO₂ max decreases. A study by Jackson et al. (1995) found the average decrease was 0.46 ml/kg/min per year for men (1.2%) and 0.54 ml/kg/min for

women (1.7%). The decline is due to a number of factors including a reduction in maximum heart rate and maximum stroke volume.

2.11.1.2 VO₂ max and performance

VO₂ max on its own is a poor predictor of performance but using the velocity (vVO₂ max) and duration (time at vVO₂ max) that an athlete can operate at their VO₂ max will provide a better indication of performance.

- Cooper VO₂ max test - suitable for endurance sports
- Multistage Fitness Test or Bleep test - VO₂ max test for endurance sports

2.11.1.3 VO₂ max - using HR_{max} and HR_{rest}

Research by Uth et al. (2004) found that VO₂ max can be estimated indirectly from an individual's maximum heart rate (HR_{max}) and resting heart rate (HR_{rest}) with an accuracy that compares favorably with other common VO₂ max tests. It is given by:

- $VO_2 \text{ max} = 15 \times (HR_{\text{max}} \div HR_{\text{rest}})$

2.11.1.4 The effect of altitude

VO₂ max decreases as altitude increases above 1600m and for every 1000m above 1600m maximal oxygen uptake decreases by approximately 8-11%. The decrease is mainly due to a decrease in maximal cardiac output (product of heart rate and stroke volume). Stroke volume decreases due to the immediate decrease in blood plasma volume.

2.11.1.5 VO₂ max Assessment

Table 1, normative data (Heywood 1998) for Female (values in ml/kg/min)

Age	Very Poor	Poor	Fair	Good	Excellent	Superior
13-19	<25	25 – 30	31 – 34	35 – 38	39 – 41	>41

Table 2, normative data (Heywood 1998) for Male (values in ml/kg/min)

Age	Very Poor	Poor	Fair	Good	Excellent	Superior
13-19	<35	35 – 37	38 – 44	45 – 50	51 – 55	>55

2.11.1.6 % HR_{max} and % VO₂ max

It is possible to estimate your exercise intensity as a percentage of VO₂ max from your training heart rate. A study by David Swain et al. (1994) using statistical procedures examined the relationship between % HR_{max} and %VO₂ max. Their results led to the following regression equation:

- $\%HR_{\max} = 0.64 \times \%VO_2 \max + 37$

The relationship has been shown to hold true across sex, age and activity.

2.12 Normative data and Evaluation Tests

Testing and measurement are the means of collecting information upon which subsequent performance evaluations and decisions are made. Where normative data (average test results) is available, it is included on the appropriate evaluation test pages which are identified below.

2.12.1 Cooper VO₂ max Test

Objective of the Cooper Test (Cooper 1968) is used to monitor the development of the athlete's aerobic endurance and to obtain an estimate of their VO₂ max.

Assessment:-

The following normative data, Cooper (1968), is available for this test:

Table 3, Male Athletes normative data Cooper test

Age	Excellent	Above Average	Average	Below Average	Poor
13-14	>2700m	2400-2700m	2200-2399m	2100-2199m	<2100m
15-16	>2800m	2500-2800m	2300-2499m	2200-2299m	<2200m
17-19	>3000m	2700-3000m	2500-2699m	2300-2499m	<2300m

Table 4, Female Athletes normative data Cooper test

Age	Excellent	Above Average	Average	Below Average	Poor
13-14	>2000m	1900-2000m	1600-1899m	1500-1599m	<1500m
15-16	>2100m	2000-2100m	1700-1999m	1600-1699m	<1600m
17-20	>2300m	2100-2300m	1800-2099m	1700-1799m	<1700m

VO₂max-An estimate of your VO₂ max can be calculated as follows:

- (Distance covered in meters - 504.9) ÷ 44

2.12.2 Multi-Stage Fitness Test

The objective of the Multi-Stage Fitness Test (MSFT), developed by Leger & Lambert (1982) is to monitor the development of the athlete's maximum oxygen uptake (VO₂ max).

Normative data for MSFT

Table 5, VO2 max value locate the Level and 20m Shuttle test.

Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
4	2	26.8	5	2	30.2
4	4	27.6	5	4	31.0
4	6	28.3	5	6	31.8
4	9	29.5	5	9	32.9
Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
6	2	33.6	7	2	37.1
6	4	34.3	7	4	37.8
6	6	35.0	7	6	38.5
6	8	35.7	7	8	39.2
6	10	36.4	7	10	39.9
Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
8	2	40.5	9	2	43.9
8	4	41.1	9	4	44.5
8	6	41.8	9	6	45.2
8	8	42.4	9	8	45.8
8	11	43.3	9	11	46.8
Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
10	2	47.4	11	2	50.8
10	4	48.0	11	4	51.4
10	6	48.7	11	6	51.9
10	8	49.3	11	8	52.5
10	11	50.2	11	10	53.1
11		51.1	12		53.7
Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
12	2	54.3	13	2	57.6
12	4	54.8	13	4	58.2
12	6	55.4	13	6	58.7
12	8	56.0	13	8	59.3
12	10	56.5	13	10	59.8
12	12	57.1	13	13	60.6

Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
14	2	61.1	15	2	64.6
14	4	61.7	15	4	65.1
14	6	62.2	15	6	65.6
14	8	62.7	15	8	66.2
14	10	63.2	15	10	66.7
14	13	64.0	15	13	67.5
Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
16	2	68.0	17	2	71.4
16	4	68.5	17	4	71.9
16	6	69.0	17	6	72.4
16	8	69.5	17	8	72.9
16	10	69.9	17	10	73.4
16	12	70.5	17	12	73.9
16	14	70.9	17	14	74.4
Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
18	2	74.8	19	2	78.3
18	4	75.3	19	4	78.8
18	6	75.8	19	6	79.2
18	8	76.2	19	8	79.7
18	10	76.7	19	10	80.2
18	12	77.2	19	12	80.6
18	15	77.9	19	15	81.3
Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
20	2	81.8	21	2	85.2
20	4	82.2	21	4	85.6
20	6	82.6	21	6	86.1
20	8	83.0	21	8	86.5
20	10	83.5	21	10	86.9
20	12	83.9	21	12	87.4
20	14	84.3	21	14	87.8
20	16	84.8	21	16	88.2

The test is made up of 23 levels where each level lasts approximately one minute. Each level comprises of a series of 20m shuttle runs where the starting speed is 8.5km/hr and increases by 0.5km/hr. at each level. On the tape/CD a single beep indicates the end of a shuttle and 3 beeps indicates the start of the next level.

The following equation, to calculate VO₂ max using the MSFT, was determined by Kilding et al. (2006) in their research with 26 elite, male, intermittent sport athletes.

$$\diamond \text{ VO}_2 \text{ max (mL/kg/min)} = 0.38 \times \text{total number of shuttles completed} + 25.98.$$

Time: - knowing that the starting speed is 8.5km/hr and increases by 0.5km/hr at each level then the time for each 20 meter section, at each level, can be estimated from the following equation:

$$\diamond 20\text{m Time} = 72 \div ((\text{Level} - 1) \times 0.5) + 8.5)$$

E.g. the time for 20m at level 11 is 5.33 seconds

Shuttles: - Knowing that the starting speed is 8.5km/hr and increases by 0.5km/hr at each level and the duration of each level is approximately one minute then the number of shuttles at each level, can be estimated from the following equation:

$$\diamond \text{Shuttles} = ((\text{Level} - 1) \times 0.5) + 8.5) \times 0.838$$

The result is rounded up to the nearest whole number e.g. the number of shuttles at level 17 is 13.82 which is rounded up to 14 shuttles.

2.12.3 30m Sprint Fatigue Power Maintenance Test

A good assessment of power maintenance (<http://www.brianmac.co.uk/fatigue.htm>)

Table 6, normative data of power maintenance

Rating	Good	Above Average	Average	Below Average
Power Score	≥ 0.9	0.85 to 0.899	0.80 to 0.849	< 0.799

2.12.3.1 Power Maintenance

Determine the average speed of the first three trials and divide it by the average speed of the last three trials. So if your times were...

- 7.1 seconds, 6.9 seconds, 6.9 seconds
- 7.0 seconds, 7.2 seconds, 7.1 seconds, 7.3 seconds
- 7.3 seconds, 7.4 seconds, 7.5 seconds

The average of the first 3 times (7.1, 6.9, and 6.9) is 6.97 seconds and the average of the last 3 times (7.3, 7.4, and 7.5) is 7.40 seconds.

Power Maintenance = $6.97 \div 7.40 = 0.94$ (Excellent)

2.12.3.2 Sprint Fatigue

Using the 10 recorded sprint times subtract your fastest time from your slowest time. For example if your slowest sprint was 7.8 seconds and your fastest sprint was 6.9 seconds your sprint fatigue is 0.9 (7.8 - 6.9)

2.12.4 BMI and normative data

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m^2). For example, an adult who weighs 70kg and whose height is 1.75m will have a BMI of 22.9.

$$\text{BMI} = 70 \text{ kg} / (1.75 \text{ m}^2) = 70 / 3.06 = 22.9$$

Table 7: The International Classification of adult underweight, overweight and obesity according to BMI

Classification	BMI(kg/m^2)	
	Principal cut-off points	Additional cut-off points
Underweight	<18.50	<18.50
Severe thinness	<16.00	<16.00
Moderate thinness	16.00 - 16.99	16.00 - 16.99
Mild thinness	17.00 - 18.49	17.00 - 18.49
Normal range	18.50 - 24.99	18.50 - 22.99 23.00 - 24.99
Overweight	≥ 25.00	≥ 25.00
Pre-obese	25.00 - 29.99	25.00 - 27.49 27.50 - 29.99
Obese	≥ 30.00	≥ 30.00
Obese class I	30.00 - 34.99	30.00 - 32.49 32.50 - 34.99
Obese class II	35.00 - 39.99	35.00 - 37.49 37.50 - 39.99
Obese class III	≥ 40.00	≥ 40.00

Source: Adapted from WHO, 2004.

2.13 Equipment and facilities of Teaching Physical Education

The problems of facilities and equipment lack of facilities become impeded or affect the attitudes of the students to be changed towards learning physical education at high school level and often persons that impart (transfer) the responsibility of setting up the organized programs becomes discouraged because of an apparent lack of facilities.

In order to secure the development of physical, mental, social and moral qualities of the students which may be gained through well directed training program certain spaces and equipment are important. Equipment is materials which are relatively permanent like balance beam, climbing ropes, climbing trees, playing fields, etc. The facilities that required for training programs are shower and dressing rooms, a gymnasium, playing fields, storage space, room for adapted activities, recreation room and classroom.

Therefore, physical education experience or activities becomes more measurable through the proper use of supplementary teaching aids (materials) and the teacher must have a variety of good instructional materials in order to meet the goals of physical education, and to encourage participation on the students towards physical education. As a result it appears or seems that the materials should also be interesting to work on and easy to use. Therefore, the way in which materials are designed and used seems to have an influence on the interest of the students.

2.14 Motivation Theory

2. 14. 1 Incentive Theory of Motivation

Incentive theory is a specific theory of motivation, derived partly from behaviorist principles of reinforcement, which concerns an incentive or motive to do something. The most common incentive would be a reward. Rewards can be tangible or intangible, and is presented generally after the occurrence of the action or behavior that one is trying to correct or cause to happen again. This is done by associating positive meaning to the behavior and or action. Studies show that if the person receives the reward immediately, the effect is greater, and decreases as delay lengthens. Repetitive action-reward combination can cause the action to become a habit. Motivation comes from two sources: oneself, and other people. (Refer to Intrinsic and Extrinsic motivation for more

information)"Rein forcers and reinforcement principles of behavior differ from the hypothetical construct of reward." A reinforce is anything that follows an action, with the intentions that the action will now occur more frequently. From this perspective, the concept of distinguishing between intrinsic and extrinsic forces is irrelevant.

Incentive theory in psychology treats motivation and behavior of the individual as they are influenced by beliefs, such as engaging in activities that are expected to be profitable. Incentive theory is promoted by behavioral psychologists, such as B.F. Skinner. Incentive theory is especially supported by Skinner in his philosophy of Radical behaviorism, meaning that a person's actions always has social ramifications: and if actions are positively received people are more likely to act in this manner, or if negatively received people are less likely to act in this manner. Incentive theory distinguishes itself from other motivation theories, such as drive theory, in the direction of the motivation. In incentive theory, stimuli "attract", a person towards them, and push them towards the stimulus. In terms of behaviorism, incentive theory involves positive reinforcement: the reinforcing stimulus has been conditioned to make the person happier.

As opposed to in drive theory, which involves negative reinforcement: a stimulus has been associated with the removal of the punishment the lack of homeostasis in the body. For example, a person has come to know that if they eat when hungry, it will eliminate that negative feeling of hunger, or if they drink when thirsty, it will eliminate that negative feeling of thirst. There are a many different reasons why we do things. Sometimes we are motivated to act because of internal desires and wishes, but at other times our behaviors are driven by a desire for external rewards. The incentive theory is one of the major theories of motivation and suggests that behavior is motivated by a desire for reinforcement or incentives.

2. 14. 2 AchievementMotivation Goal Theories

The Achievement Goal Theory is one of the main approaches among the social cognitive theories that offer an explanation for the motivation for success in sports and physical exercise environments. The Achievement Goal Theory approach emphasizes the importance of examining the fundamental goals of success in determining the behavior of

the individual. According to the Achievement Goal Theory approach there are two fundamental styles of goal achievement and success. These two goal orientations called “task” and “ego” oriented goal orientations are related to the self-judgment of individuals in terms of their level of abilities. An individual who has task-oriented goals focuses on such factors as development of skills, learning new skills, demonstrating one’s mastery in performing his/her task and working hard while ego oriented individual focuses on demonstrating his/her superior abilities and wants to defeat his/her rivals with a less degree of effort (Duda, 1993). Among these goal orientations, those sportsmen who have task oriented goals consider the competitions as a chance factor to develop their sportive skills, if their task orientation is high. The better the competitor, the more the performance of the sportsman shows (Duda, 2005).

2.14. 3 Goal Orientation MotivationTheories

The study of individual motivation is centered on “goal orientation theory,” a way of understanding motivation that provides a framework for the students’ motivational orientations as well as for the learning environment and all three types of outcomes cognitive, affective, and behavioral. Goal orientation theory also provides a framework for discussions on pedagogy, both in terms of direct instruction and constructivism.

Thus, motivation can be discussed in terms of frequency, intensity, and duration, as teacher and student strive to attain goals. Goals are critical because they organize, encourage control, and direct action. A goal to reduce one’s indebtedness requires organizingsetting priorities. A student’s goal to have a “perfect” lesson requires him or her to organize practice schedule, to control it by staying focused on the most difficult material, and to direct action into daily practicing. When the goal is attained, the student experiences a sense of competence and avoids all of the negatives that accompany a feeling of incompetence. The prevalent motivational theories based on goal orientation theory and designed to explain competence incompetence and achievement are termed self-theories and self-efficacy.

Chapter Three

Research Design and Methodology

Research needs a foundation for its inquiry, and inquires need to be aware of the implicit world views they bring to their studies (Creswell and Clark, 2007 as cited in Anduamlak, 2009). In light of this, philosophical foundations of a research represent underlying assumption on the nature of reality (ontology), how we gain knowledge of what we know (epistemology), the role values play in research (axiology), and the language of research (rhetoric). The following research design and methodology were used for the successful completion of the study

3.1 Research Methodology

Descriptive survey method was used since the aim of the research is up to describing facts and telling on the existing condition of the issues under investigation. I.e. Effects of short interval training and long interval training affecting the aerobic performance of Hisu athletics project Woreda team.

3.2 Sources of Data

The information was obtained from athletes, coaches, Woreda Athletics Federation Workers and Zone Sport Commission Officers.

3.3 Sampling and Sampling Techniques

For the specific research the following sample were selected. It is non-probability (purposive) sampling. To select athletes, Woreda athletics federation and Zone sport commission officer purposive sampling techniques was employed because of directly concerned with the issues under discussion and also because of they are few in number all of them were included in the study.

In its totality 50 subjects were participated to collect the necessary data, thus 40 athletes, 4 coaches, 4 Woreda athletics federation workers and 2 sport commission workers. The

researcher assumes that these subjects are fit to give enough information on the topic under the study.

3.4 Data Gathering Instrument

One approach of collecting valid data employed is triangulating information of key items using various means. The purpose of triangulation “using different methods and/or techniques” (questionnaires, interviews, experiment and observation is to ascertain the validity of data findings. Triangulation methods assume that it is relatively hopeless to attempt to demonstrate the validity or reliability of data using only one method. In the same vein, it is proposed that the study be conducted within the qualitative and quantitative approaches.

Based on the nature of basic questionnaires’ and data obtained different tools were used. The quantitative data was coded and entered in to SPSS version 20 statistical software. Data cleaning was follow after the data entry procedure. Data was analyzed using the same software. The resultfrom quantitative was analyzed by using frequency distribution, tables, percentage, and t-test. The qualitative data was analyzed after grouping the data in each thematic area and it was triangulated with quantitative data.To this end, questionnaires, interviews and observation were used as the main source of data gathering instruments.

3.4.1 Observation

The total population of the project was 40 were observation checklists conducting. The research prepared checklist to obtain data through observation during practical lessons where students are demonstrating skill by using available materials.

3.4.2 Questionnaires

There are 40 students and the researcher used all students under projects and distributed questionnaires to each student, that makes 100% of the total students were used to collect data from projects. According to researcher to collect relevant information the researcher prepared close ended questions.

3.4.2.1 Pilot test

A pilot test was conducted as a preliminary step to avoid errors. To do this the pilot study was conducted in Hisu athletics project, 40 trainers purposively were used.

To achieve the validity in the instruments of data collection the instruments initially prepared were checked by the advisor in order to comment the extent to which the items are appropriate in securing relevant information to the research.

Additionally, to address the issues of reliability, the pre-testing of all instruments were made. To determine the reliability of the evidence gathered through the scalar cronbach alpha, one of estimating test's reliability was used in this research.

3.5 Procedure of Data Collection

Data collections in conducting the current study, the following relevant procedures are used. In administering the questionnaires research assistant had the necessary orientation on how to distribute and collect questionnaire. Prior contacts were made with respondents to ensure willingness to participate in the study and to maximize the return rate of questionnaire. In addition to this, a face-to-face interview was conducted in order to collect every single idea of interviewees.

After giving training for students data were collected using the appropriate physical fitness Variables as mentioned below.

1. Cooper VO₂ max Test:used to monitor the development of the athlete's aerobic endurance and to obtain an estimate of their VO₂ max.
2. Multi-Stage Fitness Test:to monitor the development of the athlete's maximum oxygen uptake (VO₂ max).
3. 30m Sprint Fatigue Power Maintenance Test: is to monitor the athlete's power maintenance - sprint fatigue.

3.5.1 Physical Fitness Test procedure

The following fitness tests as the parameter of physical fitness variables were recorded for pre-test, during training test and post-tests of the study.

3.5.1.1 Cooper VO₂ max Test

Required resources:-400 meter track, stopwatch, and whistle, assistant.

How to conduct the test requires the athlete to run as far as possible in 12 minutes.

- ❖ The athlete warms up for 10 minutes
- ❖ The assistant gives the command “GO”, starts the stopwatch and the athlete commences the test
- ❖ The assistant keeps the athlete informed of the remaining time at the end of each lap (400m)
- ❖ The assistant blows the whistle when the 12 minutes has elapsed and records the distance the athlete covered to the nearest 10 meters

3.5.1.2 Multi-Stage Fitness Test

Required resources: flat non-slip surface, 20 meter tape measure, marking cones, recording sheets and assistant.

How to conduct the test: This test requires the athlete to run 20m in time with a beep from a CD recording. The athlete must place one foot on or beyond the 20m marker at the end of each shuttle.

- ❖ The athlete warms up for 10 minutes
- ❖ The assistant measure out a 20 meter section and marks each end with marker cones
- ❖ The assistant starts the CD and the athlete commences the test
- ❖ If the athlete arrives at the end of a shuttle before the beep, the athlete must wait for the beep and then resume running
- ❖ If the athlete fails to reach the end of the shuttle before the beep they should be allowed 2 or 3 further shuttles to attempt to regain the required pace before being withdrawn
- ❖ The assistant records the level and number of shuttles completed at that level by the athlete when they are withdrawn

3.5.1.3 30m Sprint Fatigue Power Maintenance Test

Required Resources:-400m track, 12 Cones, Stopwatch, Assistant.

How to conduct the test: - this test requires the athlete to complete 10 x 30m sprints.

- ❖ The athlete warms up for 10 minutes

- ❖ The assistant sets up the course as per the diagram opposite using the cones
- ❖ The assistant gives the command "GO" and starts the stopwatch
- ❖ The athlete sprints from A to B between the cones deviating 5m sideways in the middle of the sprint
- ❖ The assistant stops the stopwatch when the athlete's torso crosses the finish line at B and records the time
- ❖ The athlete jogs slowly back to point A (taking no longer than 30 seconds to do so) following the route on the diagram
- ❖ The athlete is to complete a total of 10 sprints from A to B and the assistant is to record the times

3.6 Method of Data Analysis

In this study, both qualitative and quantitative analytical procedures were employed. In conformity to this, as quoted Muluken (2006) suggested that qualitative and quantitative methods should be viewed as complementary rather than rival camps.

Hence, Frequency Counts, Percentage, Mean, Standard deviation, and the t-test and descriptive statements were used to analysis the items of the questionnaire. The data collected through structured questionnaires were presented in tables and analyzed by one of statically tools listed above and descriptive statements. In addition, qualitative data were analyzed by summarizing the words of open-ended items of questionnaire, interview and observational check lists. Finally, the data were analyses and discussed to reach at certain findings which in turn were used to give conclusion and possible recommendation.

3.7 Ethical Considerations

The researcher explained to the respondents about the research and that the study was for academic purposes only. It was made clear that the participation is voluntary and that the respondents were free to decline or withdraw any time during the research period. Respondents haven't been forced into participating in the study. The participants had informed consent to make the choice to participate or not. Moreover, the researcher was

show the value and appreciation for knowledge of the locals by inviting research assistants from the target population and however, in relation to the participants, any activity done by the researcher is based on the informants and he was kindly request them to tell truth that they have in their min.

Chapter Four

Presentation, Analysis and Interpretation of the Data

4.1 Introduction

This study was, as described in chapter, aiming at investigated the pedagogical aspect of Hisu short and long interval training effect on endurance performance: athletics project under 17 SinanaWoreda, Bale Zone, Oromia Region

This chapter deals with the presentation, analysis and interpretation of the data collected from the questionnaire, interview, observational checklists, experimental and documents were analyzed. Frequency counts, percentage, mean, standard deviation and the t-test were statistical methods employed to present and analyze the structured in items of the questionnaire quantitatively. All the data gathered from the questionnaires and experimental were organized in tabular form and are interpreted using frequency, mean, standard deviation, t-test and percentages.

The information collected through interview and observation checklist is also qualitatively described in order to give appropriate answer for the basic questions set in the study. Lastly, interview was made with coaches, woreda officers, youth and sports of Zone

4.2 Background characteristics of the study group

Based on the response obtained from administrative, track and field event trainee athletes and coaches' of the respective event in sample selected athletics project in Sinanaworeda, the characteristics of the study groups were examined in terms of their sex, age, height.

The total population of this study was 50 and of these, 40 athletes, 4 woreda coaches, 4 Sinanaworeda sport administration, 2 Zone sport federation.

The analysis and interpretation of the data are presented in the following table:

Table 8, Information of respondents by their sex

	Sex	Frequency	Percent	Valid Percent	Median	Std. Deviation
Valid	Male	25	50.0	50.0		
	Female	25	50.0	50.0	1.50	.505
	Total	50	100.0	100.0		

As indicated in the first part of this chapter, a total of 50 students were involved in the study. As shown in above table 8, those respondents are selected from SinanaWoreda under 17 age athletics project. The researcher decided to take 100 per cent of the population as a participant of the study; 50:50%representatives' male and females.

Table 9, Information of respondents by their age

	Age	Frequency	Percent	Valid Percent	Median	Std. Deviation
Valid	13yrs	19	38.0	38.0		
	14yrs	12	24.0	24.0		
	15yrs	6	12.0	12.0	2.001	.541
	16yrs	3	6.0	6.0		
	>17yrs	10	20.0	20.0		
	Total	50	100.0	100.0		

With regard to age composition, as the above table 9 indicates the information of respondents' age has been categorized: - those are distributed from the total respondents; (38%) and (24%) respectively 13years and 14 years, (12%) and (6%) of the respondents are 15years and 16 years, and the remaining respondents are above 17 years are (20%). Therefore, we can understand from the above table that the majority of students are young and above 17 years are coaches, woreda and zone officers.

Table 10, Information of respondents by their heights

	Height	Frequency	Percent	Valid Percent	Median	Std. Deviation
Valid	<145	4	10.0	10.0	3.0000	1.40967
	145-150	10	25.0	25.0		
	151-155	9	22.5	22.5		
	156-160	8	20.0	20.0		
	161-165	7	17.5	17.5		
	166-170	2	5.0	5.0		
	Total	40	100.0	100.0		

As shown in the above table 10, 4(10%) of respondents height <145cm, 10(25.0%) respondents height 145cm-150cm, the other 9(22.5%) and 8(20.0%) respondents height 151-155cm and 156-160cm respectively, the rest, 7(17.5%) and 2(5.0%) respondents height 161-165cm and 166-170cm respectively. Thus, this indicates that 3.0 ± 1.40 respondents' height.

4.3 In what way pedagogical approach were practiced

Table 11, Responses of respondents on practiced of pedagogical approach

	Valid	Frequency	Percent	Valid Percent	Mean	Std. Deviation
QP1	DA	8	20.0	20.0	4.1250	1.20229
	UND.	2	5.0	5.0		
	A	7	17.5	17.5		
	SA	23	57.5	57.5		
QP2	DA	25	62.5	62.5	2.7250	1.06187
	UND.	5	12.5	12.5		
	A	6	15.0	15.0		
	SA	4	10.0	10.0		
QP3	SDA	16	40.0	40.0	1.8500	.80224
	DA	14	35.0	35.0		
	UND.	10	25.0	25.0		
	SDA	9	22.5	22.5		
QP4	DA	13	32.5	32.5	2.3750	1.00480
	UND.	12	30.0	30.0		
	A	6	15.0	15.0		
	SDA	5	12.0	12.5		
QP5	DA	18	45.0	45.0	2.5250	.98677
	UND	8	20.0	20.0		
	A	9	22.5	22.5		
Total		40	100.0	100.0		

As shown in the above table 11 item 1, the majority, 23(57.5%) of athletes responded strongly agree, only 2(5.0) % of respondents response undecided, the other 8(20.0%) of athletes response disagree and the rest 7(17.5%) of athletes responded agree. Thus, this indicates that 4.125 ± 1.20229 most of the respondent responses were methodology affect athletes.

As shown in the above table 11 item 2, the majority, 25(62.5%) of respondents replied disagree, only 4(10.0%) replied strongly agree, the other 5(12.5%) and 6(15.0%) respondents replied respectively undecided and agree. Thus, this indicates that 2.725 ± 1.06187 most of the respondents' response coaches don't change methodology depending on the situation.

The above table 11 item 3 indicates that, 16(40.0%) and 14(35.0%) athletes respectively answered strongly disagree and disagree, the rest 10(25.0%) athletes answered undecided. Depending on the response pedagogy and practical activities can't be matched

According to the data in the above table 11 item 4, the majority 13(32.5%) and 12(30.0%) of respondents respectively replied disagree and undecided, 9(22.5%) and 6(15.0%) of athletes respectively replied strongly disagree and agree. These results shows that, the flow of instruction implement during training were not clearly delivered.

As shown data entry in the above tables 11 item 5, 18(45.0%) athletes replied disagree, 9(22.5%) respondents response agree, the rest 8(20.0%) and 5(12.5%) athletes response respectively undecided and strongly disagree. Therefore results shows that coaches don't have pedagogical knowledge and skill of coaches

4.4 In what way Coaching approach were practiced

Table 12, Responses of respondents on practiced of coaching approach

Valid		Frequency	Percent	Valid Percent	Mean	Std. Deviation
QC1	SDA	7	17.5	17.5	2.8500	1.29199
	DA	10	25.0	25.0		
	UND.	10	25.0	25.0		
	A	8	20.0	20.0		
QC2	SA	5	12.5	12.5	1.9750	.91952
	SDA	14	35.0	35.0		
	DA	16	40.0	40.0		
	UND.	7	17.5	17.5		
QC3	A	3	7.5	7.5	3.9000	1.00766
	DA	5	12.5	12.5		
	UND.	7	17.5	17.5		
	A	15	37.5	37.5		
QC4	SA	13	32.5	32.5	1.8750	.85297
	SD	15	37.5	37.5		
	DA	17	42.5	42.5		
	UND.	6	15.0	15.0		
QC5	A	2	5.0	5.0	2.0750	.72986
	SDA	9	22.5	22.5		
	DA	19	47.5	47.5		
	UND.	12	30.0	30.0		
Total		40	100.0	100.0		

According to data analyses above 12 items 1, the majority, 25.0% of respondents answered undecided, 25.0% of the respondents answered disagree.17.5%, and 20.0% and 12.5% respondents' response respectively strongly disagree, agree and strongly agree. Thus, this indicates that leadership and coaching style of the coach is not attractive.

According to the response given by Athletes in the above table 12 items 2, the majority, 40.0%, 35.0% and 17.5% of the respondents respectively, coaches do not change style of coaching based on situation and not consider athletes. Whereas 7.5% number of them replied as they get a chance to do so. Thus, this would indicate that most respondents replied that coaching style of the coach was not considered athletes and situation.

The above table 12 items 3 exhibits that, 37.5% and 32.5% of the respondents of athletes respectively replied that coaching style brings athletes improvement. Whereas12.5% of the respondents replied that coaching style do not bring athletes improvement. Whereas 17.5% of the respondents responses that undecided to athletes improvement.

Regarding the continuous evaluation items 4, 42.5% of athletes response disagree and 37.5% of respondents replied strongly disagree, where as 15.0% of athletes responses

undecided and 5% of respondents answered that agree. Lastly, the results indicate that $1.8750 \pm .85297$ there is not continuous evaluation to identify current performance of athletes.

The results of the above table 12 items 5 clearly show that, 47.0% and 22.5% of athletes respond respectively disagree and strongly disagree coaches do not use performance test to select athletes, where as 30% of respondents respond that undecided. Thus, this indicates that $2.0750 \pm .72986$ coaches did not use performance test to select athletes.

4.5 Do athletes have motivation to get involved in the training

Table 13, Responses of respondents on athletes motivation to participate in training

Valid		Frequency	Percent	Valid Percent	Mean	Std. Deviation
QM1	SDA	4	10.0	10.0	3.4250	1.31826
	DA	6	15.0	15.0		
	UND.	10	25.0	25.0		
	A	9	22.5	22.5		
	SA	11	27.5	27.5		
QM2	DA	1	2.5	2.5	4.2000	.72324
	UND.	4	10.0	10.0		
	A	21	52.5	52.5		
	SA	14	35.0	35.0		
QM3	UND.	8	20.0	20.0	4.1500	.73554
	A	18	45.0	45.0		
	SA	14	35.0	35.0		
QM4	UND.	4	10.0	10.0	4.3250	.65584
	A	19	47.5	47.5		
	SA	17	42.5	42.5		
QM5	SDA	19	47.5	47.5	1.7000	.79097
	DA	15	37.5	37.5		
	UND.	5	12.5	12.5		
	A	1	2.5	2.5		
	SA	11	27.5	27.5		
Total		40	100.0	100.0		

The above tables 13 item 1 indicates that, the athletes motivation to engage in training regarding to give prior for winning results show, 27.5% strongly agree and also 22.5% agree, the other respondents response 25.0% were undecided, while 15.0% and 10.0% were respectively replied disagree and strongly disagree. Thus, this indicates that 3.4250 ± 1.31826 athletes while engages in training the most motivation gives prior for winning rather than others.

According to the response given in the above table 13 items 2, 52.5% and 35.0% respectively replied agree and strongly agree, the others 2.5% were response disagree and the rest 10.0% replied undecided well facilities motives athletes.

Thus, this indicates that $4.2000 \pm .72324$ most athletes' responses well facilities increase motivations of athletes.

As shown in the above table 13 items 3, 45.0% of respondents' responses agree, 35.0% of the respondents replied strongly agree, while the remaining 20.0% of them replied that undecided. Results indicates that $4.15 \pm .73554$ athletes praised for effort and achieving personal goal.

As it is pointed out in the above table 13 items 4, 47.5% of respondents were response agree, 42.5% athletes responses strongly agree, the rest of them (10.0%) replied undecided to coaches motives athletes. For this data one can conclude that $4.325 \pm .65584$ most of athletes were qualified coaches increase athletes motivations.

The responses regarding to receive weakness (see the above table13) items 5 reveal that, 47.5% of respondent responses strongly disagree, 37.5% of athletes replied disagree, while 2.5% and 12.5% were respectively replied agree and undecided. From this it can be concluded that, $1.70 \pm .79097$ Athletes do not received when weakness addressed and feedback givens for athletes by coaches.

4.6 To what extent facilities and equipment are available

Table 14, Responses of respondents on facilities and equipment were available

Valid		Frequency	Percent	Valid Percent	Mean	Std. Deviation
QF1	SDA	18	45.0	45.0	1.6250	.62788
	DA	19	47.5	47.5		
	UND.	3	7.5	7.5		
QF2	SDA	13	32.5	32.5	1.8750	.72280
	DA	19	47.5	47.5		
	UND.	8	20.0	20.0		
QF3	UND.	7	17.5	17.5	4.1750	.71208
	A	19	47.5	47.5		
	SA	14	35.0	35.0		
QF4	UND.	3	7.5	7.5	4.4250	.63599
	A	17	42.5	42.5		
	SA	20	50.0	50.0		
QF5	UND.	7	17.5	17.5	4.1750	.71208
	A	19	47.5	47.5		
	SA	14	35.0	35.0		
Total		40	100.0	100.0		

In the case of sufficient available facilities and equipment items 1, 47.5 % of respondents replied disagree, 45.0% of athletes were responses strongly disagree, the rest of them 7.5% responses undecided. From this table one could see that $1.625 \pm .62788$ most of athletes were replied insufficient facilities and equipment in the project.

The above table 14 items 2 represents the use of facilities and equipment in a safe way. In this regard, 47.5% and 32.5% of respondents' responses disagree and strongly disagree respectively, rest of them 20.0% were replied undecided.

The result shows that $1.875 \pm .72280$ lack of use facilities and equipment in a safe way.

As it is clearly shown in the above table 14 items 3, 47.5% of respondents replied agree, 35.0% of athletes responses strongly agree, 17.5% of participant responses undecided. From this analysis, one could see that $4.175 \pm .71208$ most of athletes agree to lacks of facilities and equipment are affects athletes' performance.

The result in above table 14 items 4, participation of community is important to compensate the scarcities of material. Accordingly, 50.0% of respondents responses strongly agree, 42.5% were replied agree and 7.5% of athletes were responses undecided. This indicates that $4.425 \pm .63599$ community participation is the most important to fulfill the scarcities of material for athletes.

Accordingly, as it shows in the above tables 14 items 5, 47.5% of athletes replied agree, 35.0% of respondents' responses strongly agree participation of athletes to minimize the shortage of materials. Whereas 17.5% of respondents responses undecided. The results indicate that, $4.175 \pm .71208$ participation of participant is the most important to fulfill the shortage of material

4.7Is there good integration among the coach and trainee

Table 15, Responses of respondents relationship between coach and trainee

Valid	Frequency	Percent	Valid Percent	Mean	Std. Deviation
QI1	DA	9	22.5	3.4250	.98417
	UND.	10	25.0		
	A	16	40.0		
	SA	5	12.5		
QI2	SDA	12	30.0	2.0250	.86194
	DA	17	42.5		
	UND.	9	22.5		
	A	2	5.0		
QI3	SDA	12	30.0	2.3500	1.18862
	DA	11	27.5		
	UND.	10	25.0		
	A	5	12.5		
QI4	SA	2	5.0	2.9500	1.31948
	SDA	6	15.0		
	DA	11	27.5		
	UND.	8	20.0		
QI5	A	9	22.5	1.5250	.71567
	SA	6	15.0		
	SDA	1	2.5		
	DA	2	5.0		
Total		40	100.0	100.0	

The above table 15 items 1 discussed the extent of relationship between coach and athletes. As per the data collected from the respondents 40.0% and 12.5% of them, were replied agree and strongly agree respectively. Whereas 25.0% and 22.5% of the respondents consecutively replied undecided and disagree. Therefore, results show that $3.425 \pm .98417$ the extent of relationship between coach and athletes was high.

Based on, the information gained from the above table 15 items 2, 42.5% of them replied disagree, 30.0% of athletes responses strongly disagree. The rest 22.5% and 5.0% of them replied undecided and agree to the relationship between coaches and families. Results indicate that, $2.025 \pm .86194$ the extent of relationship between coach and families was low.

As the above table 15 items 3 indicates out of 40(100%) of respondents 30.0% and 27.5% replied that strongly disagree and disagree relationships of families and athletes consecutively, where as 25%, 12.0% and 5.0% of respondents replied undecided, agree

and strongly agree respectively. This result shows that, 2.3500 ± 1.18862 the extent of relationship between families and athletes were low.

According to the above table 15 items 4 shows out of 40(100%) of respondents 22.5% and 15.0% of them said that, they agree and strongly agree on strength of colleagues was good and also 27.5% and 15.0% of respondents replied that, they disagree and strongly disagree on strength of colleagues was not good. Whereas 20.0% of respondents response undecided. Therefore, results shows that, 2.9500 ± 1.31948 the strength of colleagues was not good when practice.

According to the above table 15 items 5, 57.5% of the respondents replied that there are problems of job integration between coaches and administrative body of sport. Whereas 2.5% and 5.0% replied that there was job integration between coaches and administrative body. The rest 35.0% replied undecided about job integration. Results indicates that, $1.5250 \pm .71567$ most of respondents replied lack of job integration between coach, administration body and federation.

4.8 Experimental Evaluation Result

Steps for using SPSS

- ❖ Click on Analysis→ Compare means→ Paired samples T-Test
- ❖ Click on both of the variables and move them simultaneously to the Paired Variables box
- ❖ Click on Ok

4.8.1 Physiological Test

Table 16, Mean and SD Values of Weight (kg)

Paired Samples Statistics		Mean	N	Std. Deviation	Correlati on	p- value
Pair 1	Pre Experimental Weight	50.800	20	3.81962		
	Post Experimental Weight	49.700	20	3.40433	.963	.000
Pair 2	Pre Comparison Weight	52.650	20	5.42193	.959	.000
	Post Comparison Weight	51.500	20	4.88284		

Values are in the form of mean + SD = standard deviation, Sig. =p-value

The above table 16 showed that there was significant change at 0.00 in pre-post test results. The change was seen on Weight mean differences values due to the twelve weeks physical fitness training, in which the subjects were engaged in. The mean value for experimental weight before training was 50.8+3.81kg and control weight pre training test results was 52.65+5.42 kg and experimental Weight post training results mean value was 49.70+3.40kg and control Weight post training results was 51.5+4.88 after twelve weeks training program.

Table 17, Mean and SD Values of BMI (kg/m²)

Paired Samples Statistics		Mean	N	Std. Deviation	Correla tion	p-value
Pair 1	Post Experimental BMI	22.15	20	1.772		
	Pre Experimental BMI	21.10	20	1.667	.103	.666
Pair 2	Post Comparison BMI	21.73	20	1.696	.152	.522
	Pre Comparison BMI	21.10	20	1.667		

Values are in the form of mean + SD = standard deviation, BMI= Body Mass Index.

As depicted above in table 17, the BMI mean value and standard deviation of pre experimental training test results was 21.10 ± 1.667 , control pre training test results was 21.10 ± 1.667 and experimental post training test result was 22.15 ± 1.772 and post control training test results was 21.73 ± 1.696 . When we compare BMI of pre -training test result with post training test result of the experimental and comparison BMI difference of was 1.05 and .633 kg/m^2 respectively. It also showed the 3 months physical fitness training program had positive effects on participants' endurance performance.

In this study, comparison was made between the international BMI norms and BMI test result of this finding. Based on international BMI test norms is from 18.5 – 24.9 Kg/m^2 . While this study result depicted experimental post training test result was 22.15 ± 1.772 and post control training test results was 21.73 ± 1.696 . Thus, the result found in this study is **normal weight** standard. (Norms found on page 29).

4.8.2 Aerobic Endurance Test

Table 18, Mean and SD Values of Estimated Vo2max from RHR (beat/min)

Paired Samples Statistics		Mean	N	Std. Deviation	Correl ation	p-value
Pair 1	Post Experimental Estimated Vo2 max from RHR	49.95	20	3.099		
	Pre Experimental Estimated Vo2 max from RHR	33.86	20	3.139	.791	.000
Pair 2	Post Comparison Estimated Vo2 max from RHR	49.50	20	2.768	.959	.000
	Pre Comparison Estimated Vo2 max from RHR	32.71	20	2.980		

Values are in the form of mean + SD = standard deviation, Sig. = p-value, RHR= Resting Heart Rate

The above table 18 showed that there was a significant difference in before the exercises and post training $p=.000$ after 12 weeks of individuals' estimated Vo2 max from RHR. The mean values of pre experimental estimated Vo2 max from RHR test result was

33.86±3.139 mean values and SD, pre control estimated Vo2 max from Resting Heart Rate test was 32.71+2.980 and post experimental estimated Vo2 max from training test result of RHR was 49.95+3.099 and post control estimated Vo2 max from Resting Heart Rate test was 49.50+2.768. To finding this study results, the researcher was compared the mean value of pre training test results with the post training test results. There was the significant increment was observed in the pretest and post of experimental and control estimated Vo2 max from RHR 16.09 and 16.79ml/kg/min. mean differences after twelve weeks fitness exercises.

The study has comparative estimated VO2 max form RHR experimental and comparison athletes for age group ranged from 13 to 17years. Standard norms for this test ranges from >41 for male and 51-55 for female (Heywood 1998) while the study result was found to be 49.95ml/kg/min experimental and 49.50ml/kg/min comparison estimated VO2 max form RHR. Hence, the result of this finding is Superior and Excellent (Norms found on page 22).

Table 19, Mean and SD Values of Estimated Vo2max from 20m Shuttle Run (ml/kg/min)

Paired Samples Statistics		Mean	N	Std. Deviation	Correl ation	p-value
Pair 1	Post Experimental Estimated VO2 max from 20m Shuttle	30.179	20	.60993		
	Pre Experimental Estimated VO2 max from 20m Shuttle	28.868	20	.62135	.770	.000
Pair 2	Post Comparison Estimated VO2 max from 20m Shuttle	29.780	20	.62865	.814	.000
	Pre Comparison Estimated VO2 max from 20m Shuttle	28.925	20	.54964		

The above table 19, revealed the mean values of estimated VO2 max from 30m Shuttle test results. The mean values of estimated VO2 max from 20m Shuttle experimental pre

training test results was 28.868+.621, estimated VO2 max from 20m Shuttle comparison pre training result of VO2 max from mean value was 28.925+.549. And also, experimental post training test results 30.17+.609 and comparison post training test results 29.780+.628 after twelve weeks exercises. When we compare the mean value of estimated VO2 max from 20m Shuttle performances of pre training test results with post test results of the experimental group after twelve weeks of exercises were improved by 1.311+.417 mean differences and standard deviation and pre training test results with post test results of the comparison group after twelve weeks of exercises were improved by .855+.367 mean differences and standard deviation. Generally results indicates that, increase the Vo2 max intake when we compare both experimental and control group.

The study has comparative estimated VO2 max form 20m Shuttle run experimental and comparison athletes for age group ranged from 13 to 17 years. Standard norms for this test ranges from <35 for male and <25 for female (Heywood 1998) while the study result was found to be 30.17ml/kg/min experimental and 29.780ml/kg/min comparison estimated VO2 max form 30m Shuttle run. Hence, the result of this finding is Very Poor (Norms found on page 25).

Table 20, Mean and SD Values of Estimated Vo2max from 12MR (ml/kg/min)

Paired Samples Statistics		Mean	N	Std. Deviation	Correla tion	p-value
Pair 1	Post Experimental Estimate VO2 max from 12RMT	34.76	20	4.55575		
	Pre Experimental estimate VO2 max from 12RMT	24.93	20	6.47764	.428	.060
Pair 2	Post Comparison estimate VO2 max from 12RMT	34.27	20	5.50874	.221	.350
	Pre Comparison estimate VO2 max from	22.42	20	5.80993		

12RMT

As depicted on the above table 20, there was a significant improvement observed in estimated VO2 max from twelve minutes run pre-post training tests mean values score of 12 weeks exercise. The mean value of experimental pre training tests results of twelve minutes run was 24.93+6.477, Comparison pre training test mean value result was 22.42+5.809 and experimental and comparison post training test mean value result of estimated VO2 max from twelve minutes run were 34.76+4.555 and 34.27+5.508 respectively. From these results the researcher were observed the significant improvements in their performance of the subjects due to physical fitness exercises. When we compare estimated VO2 max from 12 minutes run of pre and post test result of experimental and comparison after 12 weeks of exercises program. It showed a significant increment on the performance of the subjects within 9.833+6.121 and 11.850+7.069 mean differences. This result showed there was significant improvement in the performance of the participants' cardiovascular abilities.

The study has comparative estimated VO2 max form 12MRT experimental and comparison athletes for age group ranged from 13 to 17 years. Standard norms for this test ranges from <35 for male and 31–34 for female (Heywood 1998) the study result was found to be 34.76 ml/kg/min experimental and 34.27 ml/kg/min comparison estimated VO2 max form 12MRT. Hence, the result of this finding is Poor and Fair (Norms found on page 22).

4.8.3 Power Test

Table 21, Mean and SD Values of 30m sprinting run Test (sec.)

Paired Samples Statistics		Mean	N	Std. Deviation	Correla tion	p-value
Pair 1	Pre Experimental 30m Sprinting Test	.8060	20	.06320		
	Post Experimental 30m Sprinting Test	.8930	20	.05895	-.100	.676
Pair 2	Pre Comparison 30m Sprinting Test	.8060	20	.06320	.505	.023

Post Comparison 30m	.8730	20	.06114
Sprinting Test			

As depicted on the above table 21, the table showed results of 30m sprinting power test. The mean difference value of 30m sprinting power test from pre-test and posttest of experimental and comparison result was $-0.087 \pm .090$ and $-0.067 \pm .061$ respectively. These indicate the mean differences value varies from one test to another. Similarly, power test was increased with 0.676 and 0.023 a significant improvement was recorded after three months of fitness exercises. However 30m sprinting power test was increased due to twelve weeks of physical fitness exercises. When we compare experimental and comparison pretest results of the 30m sprinting power test after the exercise program of twelve weeks, there was an increased mean within $.80 \pm .06$ and $.80 \pm .06$. Meanwhile, experimental and comparison posttest results of the 30m sprinting power test result was $.89 \pm .05$ and $.87 \pm .06$.

The results of these findings were compared with that of international standard norms. According to standard norms the test result of 30m sprinting power test Experimental group were in the **above average** and whereas control group power test result in **above average** level with the norms (see standard norms on appendix, pages 27).

4.8.4 Paired Sample T-test Results of each parameters

Table 22, A paired-sample T-test of experimental and control group MD, SD, SED, T, DF and P

Paired Samples Test		Paired Differences				T	df	Sig. (2-tailed)
		MD	S.D	S. E.M	95% Confidence Interval of the Difference			
					Lower Upper			
Pair 1	Pre Experimental Weight - Post Experimental Weight	1.100	1.071	.2395	.598 1.601	4.593	19	.000

Pair 2	Pre Comparison Weight - Post Comparison Weight	1.150	1.565	.350	.417	1.882	3.286	19	.004
continued		Paired Differences							
Paired Samples Test				S. E. M	95% Confidence Interval of the Difference		T	df	Sig. (2-tailed)
		MD	S.D		Lower	Upper			
Pair 4	Pre Comparison BMI – Post Comparison BMI	.100	.307	.068	-.044	.244	1.453	19	.163
Pair 5	Pre Experimental RHR - Post Experimental RHR	-.800	.695	.155	-1.125	-.474	-5.141	19	.000
Pair 6	Pre Comparison RHR – Post Comparison RHR	-.600	1.667	.3726	-1.380	.18019	-1.610	19	.124
Pair 7	Pre Experimental Estimate VO2max from Shuttle - Post Experimental Estimate VO2 max from Shuttle	-1.20	.6159	.1375	-1.488	-.91190	-8.718	19	.000
Pair 8	Pre Comparison Estimate VO2 max from Shuttle - Post Comparison Estimate VO2 max from Shuttle	-1.40	.5022	.1129	-1.635	-1.1646	-12.457	19	.000
Pair 9	Post Experimental estimate VO2 max from 12RMT - Pre Experimental estimate VO2 max from 12RMT	9.83300	6.12150	1.36881	6.96805	12.69795	7.184	19	.000
Pair 10	Post Comparison estimate VO2 max from 12RMT - Pre Comparison estimate VO2 max from 12RMT	11.85050	7.06923	1.58073	8.54200	15.15900	7.497	19	.000
Pair 11	Pre Experimental 30m Sprinting Test - Post Experimental 30m Sprinting Test	-.087	.0902	.0206	-.129	-.04459	-4.294	19	.000

Pair 12	Pre Comparison 30m Sprinting Test - Post Comparison 30m Sprinting Test	-.067	.06	.0134	-.095	-.03803		-4.84	19	.000
continued		Paired Differences								
Paired Samples Test		MD	S.D	S. E. M	95% Confidence Interval of the Difference		T	df	Sig. (2-tailed)	
					Lo wer	Up per				
Pair 13	Post Experimental Estimated VO2 max from 20m Shuttle - Pre Experimental Estimated VO2 max from 20m Shuttle	1.3110	.41764	.09339	1.11554	1.50646	14.038	19	.000	
Pair 14	Post Comparison Estimated VO2 max from 20m Shuttle - Pre Comparison Estimated VO2 max from 20m Shuttle	.85500	.36729	.08213	.6831	1.0269	10.41	19	.000	

A paired-sample t-test was conducted to compare the results of pre-test and posttest of experimental and control group of weight, BMI, RHR, Estimated Vo2max from:- 20m shuttle run, 12MR and 30m Sprinting test. There was a significant difference in the scores for experimental weight (M=1.1, SD=1.07) conditions; $t(20) = 4.593$, $p = 0.00$. And control weight (M=1.15, SD=1.56) conditions; $t(20) = 3.286$, $p = 0.004$. These results suggest that experimental result of weight test does some change (N.B. since it is time 4.593 is greater than 3.286); There were significant difference in the scores for BMI experimental no change at all(normal) and control (M=.10, SD=.3077) conditions; $t(20)=1.453$, $p=0.163$; experimental RHR (M=-.80, SD=.69) conditions; $t(20)= -5.141$, $p= 0.00$ and control RHR (M=-.60, SD=1.667) conditions; $t(20)= -1.610$, $p= .124$; experimental estimated VO2 max from 30m Shuttle test result (M=1.311

, SD=.41764) conditions; $t(20)= 14.038$, $p = 0.00$ and control estimated VO2 max from 30m Shuttle test result (M=.855, SD=.367) conditions; $t(20)= 10.41$, $p =$

0.00; experimental estimated VO2 max from 12MRT result (M=9.833, SD=6.121) conditions; $t(20)=7.184$, $p=0.000$ and control estimated VO2 max from 12MRT result (M=11.850, SD=7.069) conditions; $t(20)=7.497$, $p=0.00$; experimental 30m sprinting test result (M=-0.087, SD=.0902) conditions; $t(20)=-4.294$, $p=0.000$ and control group 30m sprinting test result (M=-.067, SD=.0611) conditions; $t(20)=-4.840$, $p=0.000$. These results suggest that all tests result in improvement.

4.9 Observation

From the observational coach's check list summaries during tryouts and selections coaches do not collect signed tryout agreement from athletes and keep athlete evaluations on file. And also, during sign-ups coaches have no clue to: - arrange for announcements date, contract which includes rules and schedule for parent and athlete to sign, submit copy of contract to administration, check equipment and facilities, announcement to remind athletes when tryouts start, prepare evaluation sheet for each participant and hold staff meeting for planning.

Although, during pre-season tasks coaches does not prepare:- athletic department coaching information sheet forms, to administration and trainer , submit transportation request for season, monthly calendar and schedules- to administration and trainers, attended pre-season parent/athlete meeting- pass out and collect all needed forms and monitoring team grades – maintain academic eligibility.

In-Season tasks coaches do not take action to:- monitor & counsel academic review / probation athletes and submit athletes early release information one week prior to event.

Post-Season tasks coaches do not take responsibilities to: - collect school issued uniforms/equipment, submit head coaches self-evaluation form, schedule head coach's evaluation meeting, attend sports evaluation meeting and submit school service project form.

Off-Season tasks coaches do not check with on availability of facilities, athletic clearance for all athletes and daily schedule and rules for conditioning. Meeting to distribute rules

and schedule to athlete also not occurred, do not submit team roster to trainer and do not follow up all rules.

4.10 Analysis of Interview

Responses gathered from the interview made with current workers of Hisu Athletics project under 17 the pedagogy and training effects of short and long interval training to improve aerobic performance. Moreover, it assesses the problems at pedagogy and training and relation levels of stakeholders.

4.10.1 Pedagogy and Trainings

For the question asked about pedagogical qualification of coaches the responses gathered presented as follows: most of respondents' response the coaches were not pedagogically qualified. Because of this the coaches need additional pedagogical knowledge going with a new technology and formal skill trainings for coaches have been given, but the problem is not continuous or it has no regular bases and leads radical change on athletes and the history of SinanaWoreda.

What do you think about the appropriateness of ages of athletes in project? Regarding on the appropriateness of ages of athletes in project were responded that ages strictly determined while athletes selected and its one of the selection criteria of athletes. Therefore all athletes are appropriateness of ages in project.

4.10.2 Job integration between sport administrators

Job integration between sports administrators were each office they have own structures, duties and responsibilities practiced each activities on positions. Because of this job integration between sport administrators were good but regarding on Hisu athletics project was seen weak relationship between the stakeholder do to different problems, likes insufficient facilities and materials and also unable to response the athletes and coaches questions because of scarcities of budget.

4.10.3 Budgeting and sources of Income

Had the government allocated budget to support project? If not what was the means of generating income for those project to run the sport?

From end of 2003 to end of 2007, except having a small proportion of money allocated yearly by the Oromia regional government athletics federation. Federation didn't have sufficient amount of budget to accomplish acceptable training. As a result, sponsors had been the main sources of income. Moreover, fees collected from selling tickets had been the other main source of income. Nowadays, the federation has only a small portion of money allocated yearly by Oromia regional government, a small amount of money from a few number of sponsors and no Fees collected from selling tickets.

From the overall condition of the sport one can easily understand that the number of participant has decreased at the level of Bale zone.

4.10.4 Problems of Hisu Athletics project

How can you generally mention factors affecting Hisu Athletics project in SinanaWoreda?

There are lots of problems. Some of these are lack of: - Pedagogical knowledge of coaches, motivations of athletes, facilities and materials, track and field, sponsors, problems of outlook in the society; moreover, the sport has been left only to athletes. Furthermore, almost all members of the committee in Hisu Athletics project were not gives attentions. As the result they cannot give up considerable time working for the Hisu Athletics project.

4.10.5 Recommendation

What solution would you suggest for the problems you pointed out? Respondents suggested as the solution for the above problem listed down: - coaches must be qualified by pedagogical knowledge and skill of coaches. Using by any mechanism minimizing the scarcities of facilities and materials and also worked cooperatively with all athletes,

coaches, family and administrators. Change the outlook of society toward the projects by giving awareness and governments also give attentions for the development of the Hisu athletics project without lag backward .Generally developed strong bond with all stakeholder of sport families to minimize the problems.

Chapter Five

Summary, Conclusion and Recommendation

This chapter deals with the findings, conclusion and recommendation of the research

5.1 Summary

The main objective of this study was to investigate the pedagogical aspect of Hisu short and long interval training for endurance performance. To meet the objective in detail, the following research questions were raised.

- In what way the pedagogy and coaching is practiced?
- Is there good integration among the coach and trainee?
- To what extent facilities and equipment are available?
- Do athletes have motivation to get involved in the training?

In order to answer these questions, the descriptive survey research method was employed. The relevant data to the study was gathered through the questionnaire, interview, observation and practical experiment. In general, 50 participants were involved in the study. These are 40 Athletes, 4 coaches, 4 woreda youth and sport officer and 2 zone youth and sport officers to give genuine information for the successful completion of the research under study. The data were analyzed using Frequency Counts, Percentage, Mean, Standard deviation and the t-test and descriptive statements were used to analyze the items of the questionnaire.

In analyzing the data both qualitative and quantitative methods were applied. Based on the data gathered, the following major findings were obtained from the study.

- ❖ The study discovered that, there is no properly designed selection criterion of Athletes to join the Hisu Athletics project except age,
- ❖ The study has showed that, low pedagogical knowledge of coach in coaching and the use of methodology is not appropriate with the situation. And also, methodology and practical activities cannot be met and affects athletes. Due to the lack of

pedagogical knowledge and skill of coaches, the flow of instruction were not clearly delivered during training to Hisu Athletics projects,

- ❖ The study exposed that, training plan throughout the process of coaching and leadership style was not: - attractive, consider athletes and situation. Although, no continuous evaluation and performance test to select athletes and identify current performance of Hisu Athletics projects.
- ❖ The study reveals that, while engaging in training athletes motives for winning, effort and achieving personal goal. Although, well facilities increase motivation, but when weakness and feedback delivered the awareness and received of athletes were low.
- ❖ As presented by the study, there is problem of job integration among sport families likes: -athletes with peers, parents, sport administrators and coach.
- ❖ The study also identified that, there is inadequate facilities and equipment and training area, and problem seen on the use in safe way. Although, lack of facilities and equipment are affects athletics performance.
- ❖ Physiological test the change was seen on, Weight and BMI mean differences values due to the twelve weeks physical fitness training had positive effects on participants' endurance performance.
- ❖ According to standard norms the test result of 30m sprinting power test Experimental group were in the above average and whereas control group power test result in above average level with the norms .
- ❖ There was a significant improvement observed in estimated VO2 max from twelve minutes run, 20m Shuttle run and RHR pre-post training tests mean values score of 12 weeks exercise.

5.2 Conclusions

Based on the data that the researcher obtained and analyzed, the following basic points were forwarded as a conclusion.

- ❖ Athletes join in the Hisu Athletics project without properly sated performance evaluation test. The consequence of not using performance evaluation test to select

Athletes will leads to poor performance of the Hisu Athletics project as well as it also leads to wasting resource, time and energy of Athletes.

- ❖ The study reveals that, providing training opportunities for all coaches of the Hisu were not attractive. That is the training was not given periodically to coaches of the Hisu to upgrade the pedagogical knowledge and skill.
- ❖ Coaches of the Hisu in preparing scientific base training plan were completely week. The findings of the study also revealed that coaches of the Hisu Athletics project have shown that they have problems of pedagogical knowledge and skill in preparing training plan. It is clear that working without using plan will affect negatively the overall activities of the project.
- ❖ The job integration among the zone and woreda sport officers, federation, families, athletes and coaches are not smooth. If, this concerned bodies of the zone and woreda sport leaders are not working jointly for the same goal it will affect the result of the Hisu Athletics project team negatively.
- ❖ It was indicated that the problem encountered in the woreda Athletics training program implementation according to the respondents response through questionnaires, interview and observation there were a great constraint of facilities and equipment and insufficient training areas.
- ❖ Athletes while engages in training most of them motivation gives prior for winning rather than others, well facilities and qualified coaches increase motivations, and athletes praised for effort and achieving personal goal.

5.3 Recommendation

On the bases of the findings obtained the following points are recommended.

- ❖ The selection of Athletes is very important factor that influences the effectiveness of performance development level. Therefore coaches of the Hisu Athletics project should: -develop scientific, systematic and appropriate ways of selecting and measuring performance.
- ❖ The study reveals that as there were no training opportunities given to coaches periodically therefore combined effort is needed from woreda and zone youth and sport office and Athletics federation to upgrade the pedagogical knowledge and skills

- of coaching Athletics for better implementation. Since, qualified and skilled coach is the backbone for successful implementation of the Hisu Athletics project performance.
- ❖ Woreda and Zone youth and sport office and federation should arrange a training program for coaches in the woreda.
 - ❖ The concerned bodies of the Woreda and Zone youth and sport administrator should work together smoothly and jointly. Therefore establishing good and productive relationships requires a considerable amount of effort, patience and co-operation for the successful of the some goal.
 - ❖ The Woreda and Zone youth and sport offices and federation have to be concentrated to search a solution by giving high emphasis and designing new strategies to equip the Hisu Athletes project with sufficient resources (money, facilities and equipment training areas and skilled manpower) and the other way of creating conducive situation for the Woreda Athletics project performance progress again the above concerned bodies of the Zone youth and sport leaders should work together with different stake holder and should mobilize the society of the woreda to support the overall constraints of the Hisu Athletics project in general.
 - ❖ For Athletics development in the woreda coach and athletes should work closely at normal base to solve frequently repeated problems during training and to encourage, motivate and giving timely feedback for the Athletes to improve their performance and to strengthen their team spirit.
 - ❖ The coach should use varied instructional method and training manuals that could support him to provide quality training. Coaches must be qualified by pedagogical knowledge and skill of coaches.
 - ❖ Using by any mechanism minimizing the scarcities of facilities and materials and also worked cooperatively with all athletes, coaches, family and administrators.
 - ❖ Change the outlook of society toward the projects by giving awareness and governments also give attentions for the development of the Hisu athletics project without lag backward.
 - ❖ Lastly the researcher recommends those interested individuals to conduct a detail and further investigation on the issue under the study

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Www.matraining.com.au

APPENDIX-1
Addis Ababa University
Post Graduate Program Studies
Department of Science and Mathematics Education

A questionnaire designed on “the Hisu athletics project under 17 Sinana Woreda, Bale Zone, Oromia regional state athletics team.” The purpose of these questionnaires is to collect information on the pedagogical aspect and training of Hisu short and long interval training for endurance performance. Thus, the study is purely an academic and in no way affects the respondent’s personality or the organization

It will be kept confidential so that your genuine view, frank opinion and timely responses are very valuable in determining the success of the study. Therefore, you are kindly requested to extend your cooperation honestly by providing relevant information and filling out the following questionnaire that are prepared for this intention.

Thank you in advance for your cooperation!!

Instruction1. Write your own Background Information on the Space Provided

1. Name of the school _____
2. Grade & section _____
3. Age _____
4. Sex _____
5. Woreda _____ Zone _____ Region _____

Instruction 2 Put a“✓” mark in the boxes when the correct answer is found.

1. Strongly disagree 2.Disagree 3.Undecided 4.Agree 5.Strongly agree

No.	Questions	1	2	3	4	5
	Pedagogical aspect					
1	Do you agree that methodology affect athletes?					
2	The coaches change methodology depending on the situation?					
3	Do you agree that the pedagogy and practical activities can be matched?					
4	Do you agree that the flow of instruction implement during training clearly?					
5	Do you agree that coaches have pedagogical knowledge and skill of coaches?					
	Coaching aspect					
1	Leadership and coaching style of the coach is attractive?					
2	Do you agree coaching style based on the situation and considered participant?					
3	Coaching style bring athletes improvement?					
4	There is continuous evaluation to identify your current performance?					
5	Do you agree coaches use performance test to select athletes?					
	Motivation					
1	Would you agree your training prior for winning?					
2	Would you agree that facilities motives athletes?					
3	Would you agree Athletes praised for effort and achieving personal goal?					

4	Would you agree coaches' motives athletes?					
5	Would you agree to receive when your weakness addressed?					
	Facilities and Equipment					
1	Would you agree that facilities and equipment are sufficient?					
2	Would you agree that the use of facilities and equipment in a safe way?					
3	Would you agree that lacks of facilities and equipment are affects athletes performance?					
4	Would you agree that participation of community is important to compensate the scarcities of material?					
5	Would you agree that participation of participant is important to fulfill the material?					
	Integration/collaboration					
1	Would you agree that the extent of relationship between coach and athletes are high?					
2	Would you agree that the extent of relationship between coach and families are high?					
3	Would you agree that the extent of relationship between families and athletes are high?					
4	Would you agree that the strength of your colleagues is good when practice with peer?					
5	Would you agree that the lack of job integration between coach, administration body and federation?					

APPENDIX=2
Addis Ababa University
Post Graduate Program Studies
Department of Science and Mathematics Education

Table 24, Check List for Coaches

	Check list	yes	No	Remark
Pre-Season tasks	Is there Athletic Department Coaching Information sheet Forms			
	Do you prepare pre-season schedule to administration and Trainer			
	Did you submit transportation request for season			
	Did you submit monthly calendars- to administration and Trainers			
	Did you submit Team agreement – team rules, policies and consequences			
	Do you attend pre-season parent/athlete meeting- pass out and collect all needed forms			
	Is there monitoring team grades – maintain academic eligibility			
In-Season Tasks	Is there monitor & counsel academic review / probation athletes			
	Did you submit athletes early release information one week prior to event			
post-Season Tasks	Do you collect school issued uniforms/equipment			
	Did you submit Head Coaches Self-Evaluation Form			
	Is there Schedule Head Coaches Evaluation Meeting			

	Do you Attend Sports Evaluation Meeting (Bring copies of any proposal for change)			
	Is there contact for pre-season contest for next year			
	Do you keep check on returnee's academics			
	Do you submit school Service Project Form			
Off-Season tasks	Do you check with on availability of facilities			
	Do you check for athletic clearance for all athletes			
	Is there daily schedule and rules for conditioning			
	Is there call meeting to distribute rules and schedule to athlete			
	Do you submit off-season schedule to administration and Trainer			
	Do you submit team roster to trainer			
	Do you follow up all rules			
Sign-ups	Are you arrange for announcements of sign-up date			
	Do you contract which includes rules and schedule for parent and athlete to sign			
	Do you submit copy of contract to administration			
	Do you check equipment and facilities			
	Do you prepare daily practice plans for tryouts			
	Is there announcement to remind athletes when tryouts start			
	Do you prepare evaluation sheet for each participant			
	Do you hold staff meeting for planning			
Tryouts and Selections	Provide administration and Trainer with tryout plans and schedule			
	Do you collect signed tryout agreement from athletes			
	Do you check athletes if they are properly dressed			
	Do you keep things positive			
	Do you keep athlete evaluations on file			

Source: - www.moanaluaathletics.com/coaches/

APPENDIX=3
Addis Ababa University
Post Graduate Program Studies
Department of Science and Mathematics Education

Dear interviewee. The purpose of this interview is to gather information on Hisu Athletics project under 17 the pedagogy and training effects of short and long interval training to improve aerobic performance. Interview questions for Bale Zone Youth and Sport Commission Officers and SinanaWoreda Officers

1. Educational background
2. Occupation
3. Work experience
4. Place of work
5. What do you think about the appropriateness of ages of athletes in project?
6. How do you explain job integration between sport administrators?
7. What can you say about pedagogical qualification of coaches?
8. Had the government allocated budget to support project?
9. If not what was the means of generating income for those project to run the sport?
10. How can you generally mention factors affecting Hisu Athletics project in SinanaWoreda?
11. What solution would you suggest for the problems you pointed out?

APPENDIX=4
Addis Ababa University
Post Graduate Program Studies
Department of Science and Mathematics Education

Pilot study: reliability of the pilot test

N (40)

No.	Questions	1	2	3	4	5
	Pedagogical aspect					
1	Do you agree that methodology affect athletes?					
2	The coaches change methodology depending on the situation?					
3	Do you agree that the pedagogy and practical activities can be matched?					
4	Do you agree that the flow of instruction implement during training clearly?					
5	Do you agree that coaches have pedagogical knowledge and skill of coaches?					
	Coaching aspect					
1	Leadership and coaching style of the coach is attractive?					
2	Do you agree coaching style based on the situation and considered participant?					
3	Coaching style bring athletes improvement?					
4	There is continuous evaluation to identify your current performance?					
5	Do you agree coaches use performance test to select athletes?					
	Motivation					
1	Would you agree your training prior for winning?					

2	Would you agree that facilities motives athletes?					
3	Would you agree Athletes praised for effort and achieving personal goal?					
4	Would you agree coaches' motives athletes?					
5	Would you agree to receive when your weakness addressed?					
	Facilities and Equipment					
1	Would you agree that facilities and equipment are sufficient?					
2	Would you agree that the use of facilities and equipment in a safe way?					
3	Would you agree that lacks of facilities and equipment are affects athletes performance?					
4	Would you agree that participation of community is important to compensate the scarcities of material?					
5	Would you agree that participation of participant is important to fulfill the material?					
	Integration/collaboration					
1	Would you agree that the extent of relationship between coach and athletes are high?					
2	Would you agree that the extent of relationship between coach and families are high?					
3	Would you agree that the extent of relationship between families and athletes are high?					
4	Would you agree that the strength of your colleagues is good when practice with peer?					
5	Would you agree that the lack of job integration between coach, administration body and federation?					

No	Items	Cronbach's alpha	Cronbach's alpha based on standard items	Number of items
1	Pedagogical aspect	.934	.940	5
2	Coaching aspect	.972	.940	5
3	Motivation	.915	.940	5
4	Facilities and Equipment	.912	.940	5
5	Integration/collaboration	.938	.940	5

APPENDIX=5

Raw Data

Table 25, Estimated VO2max from RHR, 12MRT and 20m Shuttle run

Subjects Code	Estimated Vo2 max from RHR				Estimated Vo2 max from 12 MRT				Estimated Vo2 max from 20m Shuttle run			
	Experimental		Control		Experimental		Control		Experimental		Control	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
001	33.04	49.59	31.59	48.80	23.59	30.74	20.01	40.58	28.26	29.78	28.64	29.78
002	31.11	47.50	30.00	48.51	34.32	39.68	24.48	36.11	29.40	30.92	29.40	30.16
003	32.30	49.59	28.71	47.07	35.21	40.57	15.54	26.27	27.88	30.16	29.78	30.54
004	36.75	53.53	28.73	47.04	28.06	37.90	26.27	28.95	28.64	30.54	29.02	29.78
005	29.14	45.44	29.35	46.36	27.17	38.79	16.43	27.17	29.40	30.92	29.40	30.16
006	35.65	51.50	36.75	52.62	19.12	27.16	22.69	28.06	29.02	30.54	28.64	29.02
007	38.01	54.91	31.11	47.53	20.01	29.84	20.01	37.00	29.78	31.30	29.02	29.78
008	37.62	54.47	29.78	46.81	32.53	34.31	23.59	39.69	28.64	29.78	29.40	30.54
009	39.34	47.07	32.77	49.28	17.33	32.53	28.95	40.58	28.26	29.40	28.64	29.78
010	35.40	52.11	33.51	50.08	20.01	39.68	18.22	41.47	29.78	30.92	28.26	30.16
011	33.51	49.28	34.11	50.75	33.43	37.90	26.27	32.53	29.40	30.54	29.02	29.40
012	32.77	49.28	36.50	53.27	26.27	34.31	31.64	37.90	29.02	30.16	28.64	29.02
013	28.73	45.00	38.53	55.44	34.32	35.21	35.21	39.69	28.26	29.78	27.88	28.64
014	29.14	45.44	35.08	51.75	20.01	37.90	15.54	29.85	28.64	30.16	28.64	29.02
015	34.04	49.83	36.50	53.27	17.33	27.16	14.65	40.58	27.88	29.40	29.40	30.54
016	37.37	54.21	30.89	45.89	22.69	40.57	20.91	28.95	29.40	29.78	29.78	30.92
017	36.50	53.27	29.78	46.11	15.54	38.79	15.54	38.79	29.78	30.92	29.40	30.16
018	33.51	50.90	33.51	49.28	19.12	28.95	22.69	27.17	29.02	29.78	29.02	29.78
019	32.04	48.51	32.04	48.51	23.59	30.74	20.91	29.85	28.64	29.40	27.88	29.02
020	31.34	47.76	35.08	51.75	28.95	32.53	28.95	34.32	28.26	29.40	28.64	29.40

Raw Data

Table 26, Physiology and power test

Subjec ID	Weight (Kg)		BMI(Kg/m ²)		30m sprinting power test (Sec.)							
	Experimental		Control		Experimental		Control		Experimental		Control	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
001	49	48	55	52	19.14	19.96	19.96	18.90	0.76	1.04	0.80	0.83
002	52	50	49	50	21.64	20.39	20.39	20.80	0.77	0.91	0.85	0.83
003	50	48	55	53	19.28	21.76	21.76	20.96	0.88	0.87	0.79	0.84
004	44	45	48	46	19.56	23.14	23.14	22.10	0.74	0.93	0.81	0.87
005	47	46	46	47	19.81	22.49	22.49	22.98	0.95	0.97	0.78	0.84
006	58	56	47	48	21.30	19.06	19.06	19.47	0.78	1.00	0.95	1.00
007	50	49	64	63	20.02	25.00	25.00	24.60	0.85	0.85	0.77	0.85
008	48	46	59	56	22.82	21.41	21.41	20.32	0.81	0.85	0.74	0.86
009	55	53	51	50	20.95	24.25	24.25	23.78	0.75	0.94	0.75	0.82
010	56	55	50	51	21.07	20.08	20.08	21.50	0.78	0.83	0.70	0.83
011	51	50	65	63	22.67	24.76	24.76	24.01	0.77	0.91	0.90	1.00
012	53	52	55	53	22.64	21.75	21.75	20.96	0.80	0.86	0.76	0.86
013	49	50	50	49	23.30	23.45	23.45	22.99	0.83	0.86	0.83	0.83
014	54	53	47	48	24.65	21.45	21.45	21.91	0.70	0.83	0.78	0.82
015	49	50	52	50	19.87	22.21	22.21	21.36	0.79	0.90	0.88	0.84
016	55	52	58	56	20.20	21.82	21.82	21.08	0.90	0.85	0.77	1.00
017	52	50	53	51	23.42	22.64	22.64	21.79	0.73	0.85	0.82	0.86
018	43	42	51	48	21.32	24.94	24.94	23.47	0.82	0.87	0.82	0.94
019	46	48	50	51	19.14	22.82	22.82	23.28	0.89	0.83	0.89	0.89
020	44	51	48	45	19.29	19.72	19.72	18.49	0.82	0.91	0.73	0.85

APPENDIX=6

Training Schedule

Table 27, Interval training schedule for experimental group (Dec-Feb, 2015)

Days per week	Types of exercise	Duration (sec, min)	Frequency Rep/set	Recovery	Intensity of exercise
Monday 5:00-6:00pm	General warming up and Specific warming up will be employed	10 min	1/1	-	50-60% MHR
	<u>30-Second Sprint Drills</u>	30sec	1/1	30sec	>90%MH R
	<u>Speed Drills</u>	4min	10/3	4min	
	<u>Explosive Exercise Training</u>	20sec	2/2	20sec	
	Cooling down	10 min	1/1	-	50-60% MHR
Wednesday 7:00-8:00 am	General warming up and Specific warming up will be employed	10min	1/1	-	50-60% MHR
	Shuttle run	5min	6/1	5min	>90%MH R
	Sprinting(200m)	3min	3/2	3min	
	Jumping Rope	30sec	4/1	30sec	
	30-SecondSprint	30sec	10/3	30sec	50-60% MHR
	Sprint and Speed Training	1min	5/3	1min	
Friday 7:00-8:00 am	Cooling down	10 min	1/1	-	50-60% MHR
	General warming up and Specific warming up will be employed	10 min	1/1	-	50-60% MHR
	30-SecondSprint	30sec	5/3	1min	>90%MH R
	Sprint and Speed Training	1min	5/3	1min	
	Tuck jumps	40sec	3/2	40sec	
	Sit ups	50sec	5/3	45sec	50-60% MHR
	Leg press	35sec	5/3	30sec	
	Cooling down	10 min	1/1	-	50-60% MHR

The above training schedule was performed every week of the month

Source: - www.matraining.com.au

Table 28, Interval training schedule for control group (Dec-Feb, 2015)

Days per week	Types of exercise	Duration (sec, min)	Frequency Rep/set	Recovery	Intensity of exercise
Monday 5:00-6:00pm	General warming up and Specific warming up will be employed	10 min	1/1	-	50-60% MHR
	4min 1500m	22min	1/1	1min	80-90%MHR
	<u>Speed Drills</u>	4min	½	1min	
	Cooling down	10 min	1/1	-	50-60% MHR
Wednesday 7:00-8:00 am	General warming up and Specific warming up will be employed	10min	1/1	-	50-60% MHR
	Shuttle run	4min	1/1	1min	80-90%MHR
	800m running	3min	½	1min	
	Jumping Rope	4min	1/1	1min	
	4min 1500m	4min	½	1min	
	5k running	4min	1/1	1min	
	Cooling down	10 min	1/1	-	50-60% MHR
Friday 7:00-8:00 am	General warming up and Specific warming up will be employed	10 min	1/1	-	50-60% MHR
	5k(5x1000) 2.5 lap	4min	½	1min	80-90%MHR
	800mrunning	4min	1/1	1min	
	Tuck jumps	4min	½	1min	
	Sit ups	4min	1/1	1min	
	Leg press	4min	½	1min	
	Cooling down	10 min	1/1	-	50-60% MHR

The above training schedule was performed every week of the month

Source:-[Www.matraining.com.au](http://www.matraining.com.au)

APPENDIX =7

Fitness Pre Test Assessment Record Sheet

Name _____ Date _____

Height _____ Grade/section _____

Weight _____ BMI _____

Age _____ Code _____

Table 29, students' fitness test assessment record sheet

No	Types of test (parameters)	Primary factors parameter to be measured	RHR	Units	Test		Remark
					Pre test	Post test	
1	30m sprint test	A simple fitness test to measure power		Sec			
3	Cooper 12 min run test	A fitness test to measure aerobic power(VO2max) indirectly		ml/kg/m ²			
3	shuttle run test	To estimate aerobic power but more for multisprint sports. Also effective for testing large group at a time		ml/kg/m ²			

Source: - [Www. make over fitness.com/fitness assessment/](http://Www.makeoverfitness.com/fitnessassessment/)

DECLARATION

I declare that this thesis is my original work, has not been presented for a degree in another

University and that all Sources of materials used for the thesis have been duly acknowledged.

Name: - -----

Signature: -----

Date: - -----

This has been submitted for examination with my approval, as a university advisor.

Name: - -----

Signature: - -----

Date: - -----