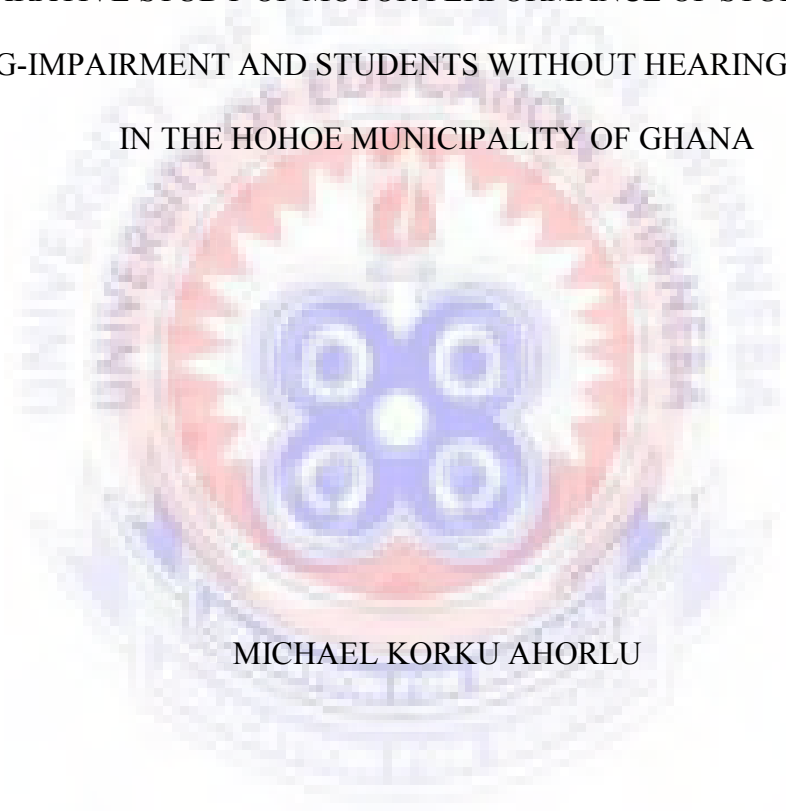


UNIVERSITY OF EDUCATION, WINNEBA

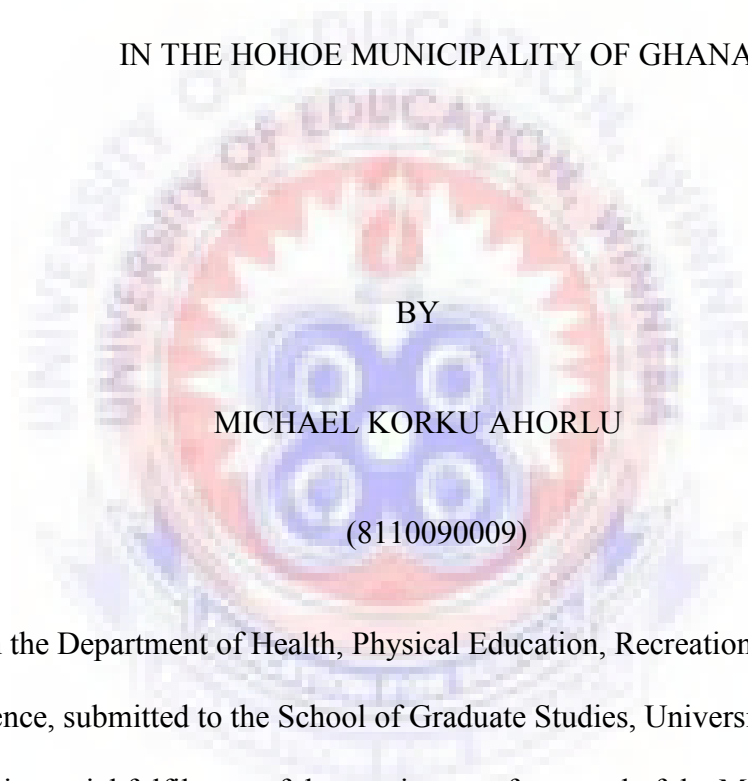
COMPARATIVE STUDY OF MOTOR PERFORMANCE OF STUDENTS WITH  
HEARING-IMPAIRMENT AND STUDENTS WITHOUT HEARING-IMPAIRMENT  
IN THE HOHOE MUNICIPALITY OF GHANA



MICHAEL KOR KU AHORLU

UNIVERSITY OF EDUCATION, WINNEBA

COMPARATIVE STUDY OF MOTOR PERFORMANCE OF STUDENTS WITH  
HEARING-IMPAIRMENT AND STUDENTS WITHOUT HEARING-IMPAIRMENT  
IN THE HOHOE MUNICIPALITY OF GHANA



BY  
MICHAEL KORKU AHORLU  
(8110090009)

A thesis in the Department of Health, Physical Education, Recreation and Sports, Faculty  
of Science, submitted to the School of Graduate Studies, University of Education,  
Winneba in partial fulfilment of the requirement for award of the Master of Philosophy  
Degree in Physical Education.

JULY, 2013

## DECLARATION

### CANDIDATE'S DECLARATION

I, Ahorlu Michael Korku declare that this Thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Candidate's Signature.....

Date.....

### SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of Thesis as laid down by the University of Education, Winneba.

Supervisor's Name: .....

Signature: .....

Date: .....

## ACKNOWLEDGEMENTS

I wish to acknowledge the support and advice I received from Dr. P. B. Akuffo my supervisor, Professor Omotayo Seun who was my first supervisor, Prof. Ammah, Prof. Pufaa, Dr. Baba, Dr. Agbeko and other lecturers of the Department of Health, Physical Education, Recreation and Sports for their guidance and suggestions throughout the study. I am also grateful to my colleagues in University of Education, Winneba and other individuals that enabled me to complete this study

I am most grateful to the Headmasters and staff of Volta School for the Deaf and St. Francis Junior High School for giving me the opportunity to conduct the study in their various schools. I also express my heart-felt gratitude to Adzaku Kenneth, Dzuazah Samuel, Ab-dulai Rahim, Larweh John, Wilson Okpantey, Seth Kwawu and Ababio Esther for their assistance given to me during my data collection.

## **DEDICATION**

I dedicate this work to my dear wife Ahanyabui Joyce Ezenam and children for their love, support and understanding that they gave during this work. I also dedicate it to my late father P. A. K. Ahorlu who gave me education to become what I am today.

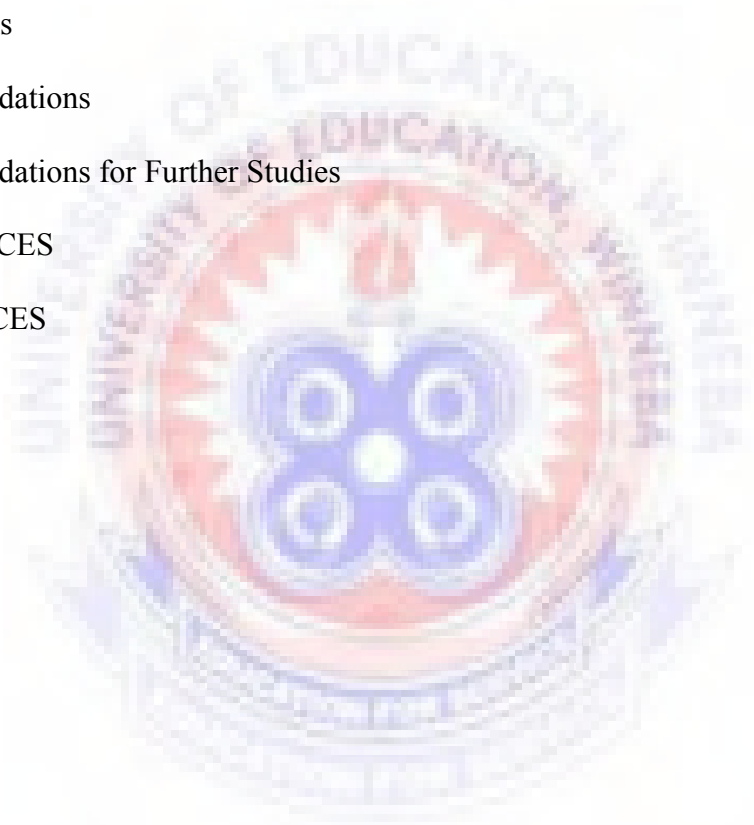


## TABLE OF CONTENTS

<b>Content</b>	<b>Page</b>
DECLARATION	
ii	
ACKNOWLEDGEMENTS	iii
DEDICATIONS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
ABSTRACT	ix
CHAPTER ONE: INTRODUCTION	1
Background to the Study	1
Statement of the Problem	12
Purpose of the Study	13
Research Hypotheses	13
Significance of the Study	14
Delimitation of the Study	14
Limitation of the Study	15
Operational Definition of Terms	15
CHAPTER TWO: REVIEW OF RELATED LITERATURE	17
How the Right of People Living with Disability Started	17
The Critical Disability Theory	22
The Meaning of Motor-skill Related Physical Fitness	42
Fitness and Disability	47

The Role of Sport and Adapted Physical Activity for People with Disabilities	47
Barriers to Participation	49
The Participation of People with Hearing-impairment in Sports Activities	55
The Participation of People with Hearing-Impairment in Sports Activities in Ghana	66
Motor-skill Related Physical Fitness Components	75
Summary of Literature Reviewed	113
<b>CHAPTER THREE: METHODOLOGY</b>	118
Research design	118
Population	121
Sample and Sampling Technique	121
Instrumentation	122
Validity and Reliability of the Test Instrument	123
Data Collection Procedure	123
Data Analysis	129
<b>CHAPTER FOUR: RESULTS, FINDINGS AND DISCUSSIONS</b>	130
Results	130
Sub-hypothesis 1	130
Sub-hypothesis 2	132
Sub-hypothesis 3	134
Sub-hypothesis 4	135
Sub-hypothesis 5	137
Sub-hypothesis 6	139

Discussions	140
CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS	151
Overview of Research Problem and Methodology	151
Summary	152
Conclusion	153
Implications	155
Recommendations	155
Recommendations for Further Studies	156
REFERENCES	157
APPENDICES	166





## LIST OF TABLES

Table 1: Independent samples t-test of the two groups in running speed (30m dash)	131
Table 2: Independent samples t-test of the two groups in running speed (50m sprint)	131
Table 3: Independent samples t-test analysis of the two groups in static balance	132
Table 4: Independent samples t-test analysis of the two groups in dynamic balance	133
Table 5: Independent samples t-test analysis of the two groups in muscular power of the leg	134
Table 6: Independent samples t-test analysis of the two groups on muscular power in the arms	135
Table 7: Independent samples t-test analysis of the two groups in eye-hand coordination	136
Table 8: Independent samples t-test analysis of the two groups in eye-foot coordination	137
Table 9: Independent samples t-test analysis of the two groups in reaction time	138

Table 10: Independent samples t-test analysis of the two groups in

Nelson-Choice-response

movement

138

Table 11: Independent samples t-test analysis of the two groups in regarding agility

139

Table 12: Independent samples t-test analysis of the two groups in South Eastern

Missouri

State

University

(SEMU)

Agility

Run

test

140



## ABSTRACT

The purpose of the study was to compare the motor skill-related physical fitness levels of the hearing-impaired and non hearing-impaired students of Volta School for the Deaf and St. Francis Junior High School in the Hohoe municipality. A cross-sectional design was used in conducting this study. This type of design utilizes different groups of people who differ in the variable of interest, but share other characteristics such as socio-economic status, educational background, and ethnicity. The target population for the study was the students of Volta School for the Deaf and all basic school students in the Hohoe municipality. In all, hundred participants were used for the study; fifty with hearing-impairment and the other fifty without hearing-impairment. Volta School for the Deaf was selected purposely for the study because it was the only school for the deaf in the region and for that matter in the Hohoe municipality while a simple random sampling technique was used to select St. Francis Junior Secondary School from among mixed schools in the municipality that had students without hearing-impairment. The University of Illinois Test Instruments designed by American Alliance of Health, Physical Education, Recreation and Dance (AAHPERD) in 1986 was used to collect data. The t-test and descriptive statistics on Statistical Package for Social Sciences (SPSS) software were used to analyse the results of the assessment conducted on the participants. An alpha level of 0.05 for two-tail was used. The result showed that there were no significant differences between the two groups in the use of power, speed and reaction time but there were differences in coordination, agility and balance.

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background to the Study

Physical education is an all encompassing term, including fitness, skills, movement, dance, recreation, health, games and sport plus the appropriate values and knowledge of each. The skills developed through a good physical education programme are critical in ensuring that students have success in many of the sports and leisure activities common to the community. This view is affirmed in the report, Sport Education (Victorian Ministry of Education, 1987) where physical education was characterised as the “foundation stone” on which an effective sport education programme can be built. It is therefore the responsibility of every physical education teacher to ensure that students in their formative years develop basic physical education skills. This includes the development of the essential fundamental motor skills.

Inclusion practice in General Physical Education (GPE) means educating students with disabilities (mild to severe) using special resources as needed, in safe, successful, and satisfying learning experiences with classmates without disabilities (Block & Vogler, 1994). Scholars have claimed that there are attitudinal, social, and educational benefits to be derived from inclusion practices in GPE for students with and without disabilities (Block, 1998; Sherrill, 1998; Sherrill, Heikinaro-Johansson, & Slininger, 1994). It is often assumed that social interactions between students with and without disabilities in GPE classes are positive and contribute to feelings of acceptance and camaraderie. To date, however, limited research exists that supports this assumption. Increasingly,

scholars have studied the social experiences of students with disabilities in GPE classes. Blinde and McCallister (1998), after interviewing elementary, junior high, and senior high school students with disabilities, reported that some of these students had limited opportunities to participate fully in their GPE classes. Exclusion from class activities led some students to feel like outsiders in their classes and unwelcome by classmates without disabilities.

Goodwin and Watkinson (2000) also studied the experiences of elementary school-age students with physical disabilities in GPE and reported finding a dichotomy in terms of students experiencing good days and bad days. To paraphrase, good days were described as students with physical disabilities having experiences that were positive (i.e., supportive interactions with classmates and teachers) and meaningful (i.e., those experiences that promoted a sense of belonging, opportunity to share in the benefits of the GPE programme, and the opportunity to engage skilfully with classmates). In contrast, students with physical disabilities described their bad days experiences as unhappy when they encountered social isolation (i.e., rejected, neglected, or seen as objects of curiosity by their classmates), were perceived as different due to their disability, or had their participation inhibited (i.e., lack of support from teachers, a scarcity of engagement from classmates, constraints imposed by the instructional space, or all three) (Goodwin & Watkinson, 2000, pp. 151-154). Contact theory posits that favourable conditions or good days such as those reported by Goodwin and Watkinson would create favourable attitude shifts, while unfavourable conditions (i.e., bad days) would create unfavourable attitude shifts.

Goodwin (2001) further studied the meaning of help in GPE as perceived by elementary school-aged students with physical disabilities and reported that peer interactions were perceived as self-supporting or self-threatening. More specifically, for students with disabilities assistance from their classmates without disabilities was perceived as either self-supporting (i.e., helpful in terms of assistance with equipment, mobility, and active participation in activities) or self-threatening resulting in a loss of independence, concerns for self-esteem, or restricted participation. Although not conceptually examined in Goodwin's (2001) study, contact theory considers establishing equal-status relationships as important (Slininger, Sherrill, & Jankowski, 2000). Equal-status implies that both students with and without disabilities engage in helping behaviours with one another, rather than only those students without disabilities unilaterally providing help to their classmates with disabilities (Sherrill et al., 1994; Slininger et al., 2000).

Place and Hodge (2001) examined the behaviours of three eighth-grade girls with physical disabilities and their classmates without disabilities in a GPE programme at an urban middle school relative to social inclusion. Their findings indicated that students with and without disabilities infrequently engaged in social interactions. Two themes emerged from interviews with the three girls with physical disabilities: (a) segregated inclusion (i.e., referred to times when students with disabilities were separated from classmates without disabilities in terms of proximity) and (b) social isolation (i.e., referred to group separateness between students with and without disabilities). These girls interacted with each other to a greater degree than with classmates without disabilities.

Basic education according to the 1992 Constitution of Ghana, is the birth right of every child irrespective of ethnicity, religion, gender, disability and geographical location. The curriculum of basic education in Ghana, like all other curricula incorporates physical education as a requirement based on UNESCO Charter Article 1:1. The physical education syllabus has various physical activities to be taught to enhance the physical fitness of the individual child. According to a definition by the World Health Organisation (WHO), physical activity is any bodily movement produced by the skeletal muscles that require energy expenditure.

The role of physical education in the school curriculum, therefore, is to help students develop the competencies and beliefs necessary for incorporating regular physical activity into their lives. Through involvement in a well-taught physical education programme, students can achieve physical and personal benefits. In the school environment, physical education is viewed as a unifying term for a range of interrelated areas that aim to “physically educate” students. Students who engage in physical education develop the knowledge, skills, understanding and motivation to seek health and physical competence through lifelong involvement in physical activity. Physical education seeks to promote healthy lifestyles among students and it is the process through which sport, outdoor adventure activities, dance, gymnastics, aquatics and games are used by physical educators to help students learn motor skills and to learn about and achieve physical fitness where this is possible. Physical education activities also assist the school to develop personal and social skills in students.

The development of motor skills and knowledge must begin in the earliest years of primary school. During these years, students are physically and intellectually capable

of benefiting from instruction in physical education and are highly motivated and enthusiastic about learning. However, throughout a student's school life age-appropriate instruction must be provided during physical education. During the early primary school years, students must be given the opportunity to learn the essential motor skills upon which later learning is dependent. These fundamental motor skills are often displayed by children at play. They include the overhand throw, catch, punt, kick, forehand strike, two-hand side-arm strike, ball bounce, run, leap, dodge and vertical jump. Mastery of these skills by children is necessary if optimum development of higher-level skills is to occur. Children who do not master these skills are less able and often less willing to persist with the difficult task of learning more complex motor skills, and will avoid activities which expose them to "public failure". Ultimately, such children encounter a sport skill proficiency barrier and reject participation in physical activity as part of their lifestyle.

During the later primary years, students should be taught a broad range of transitional, or lead-up, motor skills and activities. Examples of skills and activities in this group include: basketball dribble, modified netball, paddle tennis and modified baseball. The skills and activities at this level may be combined or modified in various ways, practiced with or without equipment and taught through individual practice or by incorporating them into game structures. During the secondary years, students should receive physical education that enables and encourages them to further develop their motor skills such as throwing, catching and batting, learned previously, into the more complex and specific sport and leisure activities common to the community.

The challenge for teachers of physical and sport education is to integrate the teaching of fundamental motor skills into movement and sports programmes. Existing



programmes should not be abandoned but reviewed in the light of the contribution that they can make to the development of fundamental motor skills and these skills are not easy for children to master. A number of critical issues must be attended to by teachers to support this learning. The essential fundamental motor skills must be mastered by children. Teachers should aim to teach for the mastery of fundamental motor skills rather than awareness. An attempt at a fundamental motor skill by a student is to be applauded. However, teachers should not accept an attempt at a fundamental motor skill as evidence of mastery of the skill. Students are expected to achieve mastery of fundamental motor skills. It is essential that teachers understand fundamental motor skills are critical for children to learn during the primary school years.

Children learn best when they are provided with specific feedback related to their learning efforts. To assist children to learn motor skills, teachers must provide feedback for children to learn. Feedback is most useful when it is specific and provided soon after a learning activity. Specific feedback occurs when a teacher provides the child with information that identifies how the child performed in comparison to what was expected. In relation to fundamental motor skills, teachers should compare the performance of each child against his or her knowledge of the components of the fundamental motor skill being taught. Teachers should tell children which components of the fundamental motor skill they have mastered and which components they need to improve.

Available evidence indicates that it takes between 240 and 600 minutes (4-10 hours) of instruction to teach children to correctly master and perform fundamental motor skills. How long it takes to learn different fundamental motor skills depends on the conditions of instruction (i.e. teacher expertise, equipment, class size, age of learner,

teaching methodology, complexity of the skill being taught, etc.). Many people underestimate the amount of time it takes to master fundamental motor skills and try to teach too much too quickly. When this underestimation occurs, teachers end up teaching for awareness or participation rather than teaching for mastery.

In the school environment, physical education is viewed as a unifying term for a range of interrelated areas that aim to “physically educate” students. Students need to be physically active to grow properly. According to the National Association of Sports and Physical Education (NASPE), elementary classes should spend 150 minutes every week in physical education. Educators should place a priority on children being active at school and emphasize the importance of a strong physical education programme. Physical education offers students a chance to learn how to keep themselves healthy with life-long skills. In a report by the University of Michigan, physically fit students are less likely to participate in risky behaviour and miss school. Participating daily in physical activity also functions as a way for students to reduce stress levels and improve their moods, according to the report.

Physical education in school has many benefits. According to the report "Physical Fitness and Sports" by the California Governor's Council, students who have regular physical education classes increase their self-esteem, social development, weight control, stress management, motor skill development and academic performance. Physical education classes that actively engage students to learn more skills and be more responsible for their body produce students who understood the importance of living healthy. As can be seen, physical education contributes so much towards making a child (both able and disabled) grow into a healthy, intelligent, confident and level-headed adult.

It can be rightly said that it's not just for individual growth, but for the improvement of the whole society, physical education should be made an important part of the school curriculum.

The importance of physical education in schools can be seen with the way it relaxes the students. Often times, students, particularly in their adolescent years, face various kinds of pressure and experience stress and anxiety. Participation in physical activities can act as a stress buster for them. Researchers have shown that when a person exercises, the levels of cortisol, a stress hormone, get reduced. Moreover, a person who exercises every day is able to sleep better, thus giving enough time to his or her body to repair and restore. This proves that by making an exercise a routine, a student can remain stress-free, relaxed and concentrate more on his or her studies and other important things. There is an important need to expand physical activity and athletic opportunities for individuals with disabilities. The benefits of physical activity and athletic programmes are equally important for individuals with disabilities as they are for all individuals. Physical activity is an effective intervention for addressing the obesity epidemic that is especially problematic for individuals with disabilities. Individuals with disabilities who participate in physical activity have higher self-esteem, better body images and higher rates of academic success. They are more confident and more likely to graduate from high school and matriculate in college and experience greater career successes and more options.

Despite these benefits, individuals with disabilities are not getting the same amount of physical activity and athletic opportunities as individuals without disabilities. Although individuals with disabilities have made significant gains since the passage of

the Americans with Disabilities Act of 1990 and the Rehabilitation Act of 1973, people with disabilities are still facing pervasive inequities in physical activity and sports programmes, particularly in our educational institutions. We know that comprehensive change is needed to address the systemic exclusion and discrimination students with disabilities face in terms of physical activity opportunities and resources for sports participation. For youth to develop into self-aware, civically engaged, contributing members of society, they require equal access to resources that will enable them to feel safe, healthy and included in all areas of society. Individuals with disabilities, however, are consistently excluded from participating in mainstream society and fully accessing these resources. An individual with a disability would tell you that their exclusion is manifested in:

- Physical and attitudinal barriers
- Stigma and stereotypes and
- A chronic lack of opportunity

Physical activity and sport hold the potential to serve as a unique conduit to facilitate the inclusion of persons with disabilities within the mainstream community. We know the benefits of physical activity and sports participation are significant for girls and women. Since reducing barriers of inclusion for women in athletics and physical activity, they have experienced the benefits such as higher self-esteem (Richman & Shaffer, 2000) and reduced health risks. Girls and women who participate in sports have higher graduation rates (Sabo, Melnick, & Vanfossen, 1989) and are less likely to be involved in an unintended pregnancy (Dodge & Jaccard, 2002). The benefits of physical activity and sport participation for people with disabilities are also significant. Physical activity and

sport participation for individuals with disabilities prevents health problems by reducing the risk of developing heart disease, controlling weight, building lean muscle, reducing fat (US Dept. of Health and Human Services, 1996) and preventing osteoporosis (Kannus, 1999). It reduces the risk of developing secondary conditions that are related to a primary disability, such as fatigue, obesity, social isolation, de-conditioning, etc.

In addition to prevention of secondary conditions and promotion of overall health and wellbeing, physical activity can be important in the day-to-day life of people with disabilities. The strength and stamina that is developed by participating in physical activity can help maintain a higher level of independence. Increases in physical activity may also affect a person's ability to go to school, work, and participate in all aspects of community life. Individuals with disabilities who participate in sports have higher self-esteem, better body images and higher rates of academic success; are more confident and more likely to graduate from high school and matriculate in college. Furthermore, sport is where skills like teamwork, goal-setting, the pursuit of excellence in performance and other achievement-oriented behaviours necessary for success in the workplace are developed.

Furthermore, opportunities to participate in athletics for students with disabilities are virtually non-existent. High school athletic associations in less than ten states and fewer than fifteen colleges and universities offer adapted interscholastic or intercollegiate sports programmes for students with disabilities. The limited programmes that do exist are often created as a result of the advocacy efforts from non-profit organizations, who partner with athletic associations to provide adapted programmes. This demonstrates that,

when left to their devices, schools have not and will not assume the responsibility for creating athletic programmes for students with disabilities.

We know from students and their families that students with disabilities are frequently not being included in athletic programmes with students without disabilities, are discouraged from participating, or are encouraged to assume less physically active roles with school programmes. The limited cases of inclusion that do exist tend to be a result of lawsuits or challenges brought by the students with disabilities invoking their rights. This problem is exacerbated for youth in urban settings and for girls. In urban settings, infrastructure problems limit safe transportation, adequate field and play space, and well-trained coaches, thus youth in urban settings have one-third the opportunity to participate in sport than their suburban counterparts.

Girls participate in physical activity and sports even less than the boys. They participate at half the rate as boys (Hannon, Cradock, Gortmaker, Wiecha, El Ayadi, Keefe, Harris, Finkelstein, Fitzgerald, & Sobol, 2002). Youth with disabilities are the last to reap the physical, emotional and social benefits of sport, all of which support their development into successful, contributing members of society.

The teaching of physical education in our special schools was made compulsory by the Government by providing these schools with detached sport teachers. But, unfortunately, the attitude of people towards their counterparts displaying some behavioural deviations needs much to be desired. This is because these people were regarded as being evil or touched by some divine powers. Furthermore, people all over the world especially in the developing countries where human right issues are not catching up well with them, have the belief that, children or people with special needs

like the hearing-impaired or physically challenged cannot perform physical activities as well as normal children (Akuffo, 1998).

## **1.2 Statement of the Problem**

Despite the numerous benefits that one derives from physical education, individuals with disabilities are not getting the same amount of opportunity as their counterparts the hearing individuals. This is because the subject has been neglected entirely with the excuse that children with special needs do not deserve any proper physical education classes and that people with hearing-impairment cannot perform physical activities as well as their counterparts without hearing-impairment. But the performances of these children during inter-school sport meetings however, revealed that given the same opportunity; students of Volta School for the Deaf could equally participate in sport related activities. The hypothetical nature of this assumption has prompted the investigation of this problem to find out whether there would be any significant difference between the hearing-impaired and non hearing-impaired students regarding motor-skill performance levels. Therefore, the need to compare the motor skill performance levels of the hearing-impaired and non hearing-impaired students of Volta school for the Deaf and St. Francis Junior Secondary School all in Hohoe.



### **1.3 Purpose of the Study**

The purpose of the study was to compare the motor skill performance levels of the hearing-impaired students of Volta School for the Deaf and students without hearing-impairment at St. Francis Junior Secondary School all in the Hohoe Municipality. This was to enable me find out if any significant differences existed between the two groups.

### **1.4 Research Hypotheses**

The following research hypotheses were tested;

1. There would be significant difference between the students with hearing-impairment and non hearing-impairment in Speed Test.
2. There would be significant difference between the students with hearing-impairment and non hearing-impairment in Balance Test.
3. There would be significant difference between the students with hearing-impairment and non hearing-impairment on Coordination Test.
4. There would be significant difference between students with hearing-impairment and non hearing- impairment in Reaction Test.
5. There would be significant difference between students with hearing-impairment and non hearing- impairment in Agility Test.
6. There would be significant difference between students with hearing-impairment and non hearing- impairment in Power Test.



### **1.5 Significance of the Study**

In the first place, the study would help teachers of special education (Adapted Physical Education) and their counterparts the regular physical education teachers to be aware of any significant differences that exist between the two groups of students regarding their motor-skills performance levels, so that they can use it as a basis for their sport training.

Second, the study would be beneficial to some institutions like the Ministry of Education and the Ghana Education Service in formulating relevant policies on mainstreaming the students with hearing-impairment with students without hearing-impairment regarding their motor-skill related activities. The study would enable students with hearing-impairment to be aware of their motor-skill performance levels, and create a basis of comparison with other groups.

Finally, it will also help Physical Education Teachers to understand and use the appropriate method of teaching motor skill performance activities which can facilitate the teaching and learning process of pupils at the basic schools. It is hoped that this study will provide Physical Education teachers with an effective means of improving their students' performance, increasing their interaction, and promoting positive attitudes toward them.

### **1.6 Delimitation of the Study**

The study was delimited to only two schools in the Hohoe Municipality, and these are Volta School for the Deaf and St. Francis Junior Secondary school. St. Francis Junior Secondary School was selected randomly from a sample of all mixed Junior Secondary

Schools in the Hohoe Municipality. The Volta School for the Deaf on the other hand, happens to be the only such school in the Hohoe Municipality.

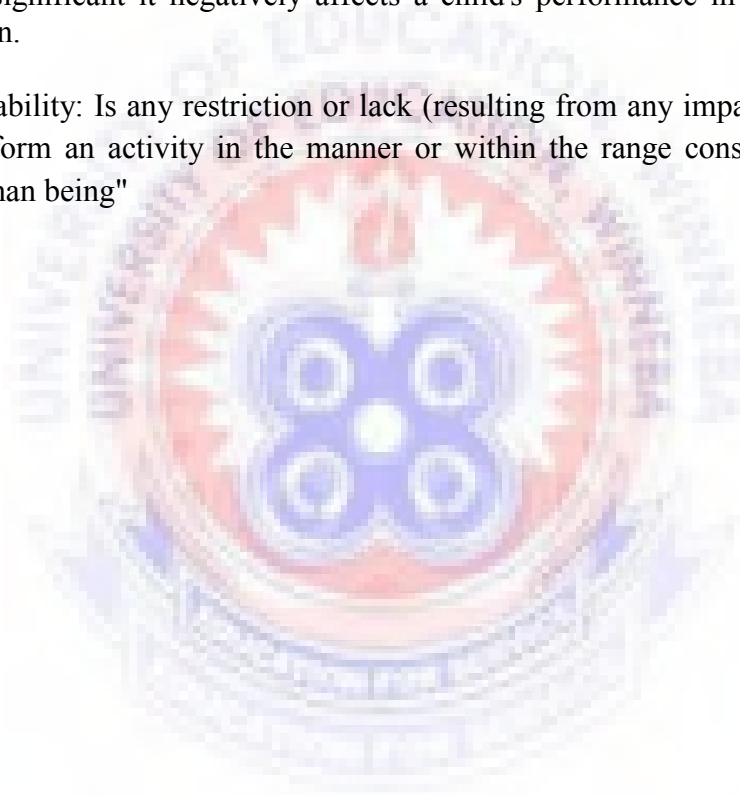
### **1.7 Limitation of the Study**

The absence of a reliable literature on motor-skill performance testing in Ghana, led to the reliance on the University of Illinois Test Instrument designed by American Alliance of Health, Physical Education, Recreation and Dance (AAHPERD) in 1986. There might have been some slight differences in the performance of the test items by Ghanaian students due to their lifestyle, conditions of the environment, age differences, as well as the culture of skill-related physical fitness performance. Though the testing was carried out or conducted in different places, the equipment and materials used were the same and may not significantly affect the outcomes or results of the study.

### **1.8 Operational Definition of Terms**

- a. Silent Games: This is an ancient name for Deaflympic Games.
- b. Circuit Team: It is the selection of students from schools within the same locality in order to represent that locality in sport competitions.
- c. Flying Start: It is starting a sprint race some metres ahead of the starting line.
- d. Reaction time: Is the time that elapsed between stimulation and the beginning of reaction to that stimulation.
- e. Speed: Is the production of repeated maximal muscular contractions over a short distance within minimal period of time.
- f. Power: It is the rate at which energy is expended or work is done.

- g. Coordination: Is the ability to use the senses with the body parts to perform tasks smoothly and accurately.
- h. Balance: Is the ability to maintain some degree of equilibrium while moving or standing still.
- i. Agility: Is the ability to rapidly and accurately change the direction of movement of the entire body mass in space.
- j. Hearing-impairment: Is a permanent hearing loss or a decrease in hearing that is so significant it negatively affects a child's performance in school or ability to learn.
- k. Disability: Is any restriction or lack (resulting from any impairment) of ability to perform an activity in the manner or within the range considered normal for a human being"



## CHAPTER TWO

### 2.0 REVIEW OF RELATED LITERATURE

This chapter presents a review of related literature to the study of motor-skill performance levels of the hearing-impaired and those without hearing-impairment. Precisely, the literature review was discussed under the following sub-headings:

- How the Right of People Living with Disability Started
- The Critical Disability Theory
- The Meaning of Motor Skill
- Fitness and Disability
- The Role of Sport and Adapted Physical Activity for People with Disabilities
- The Participation of People with Hearing-impairment in Sports Activities

The components of motor-skill related physical fitness are:

- Agility
- Balance
- Co-ordination
- Power
- Speed
- Reaction time

#### 2.1 How the Right of People Living with Disability Started

The awareness for people with disabilities started in the 1960's when President John F. Kennedy of USA developed interest in the mentally retarded, because his sister,

Rose Kennedy, had the condition. In 1961, he created the President's panel on mental retardation. Acting on the panel's recommendations, President Kennedy encouraged the enactment of the Major Mental Retardation Act in 1963. Amendments to this law saw the initial advocacy for physical education and recreation for persons or people with disabilities in 1967 (Sherill, 1993). It was through these enactments that the Rehabilitation Amendment Act of 1973 (PL. 93-112), the Amateur Sports Act of 1978 (PL .95-606), Americans with Disabilities Act of 1990 (PL. 101-336), the Development Disabilities Assistance and Bill of Rights Act of 1990 (PL. 101-496), and the Individuals with Disabilities Education Act (IDEA) of 1990 (PL. 101-476) were enacted.

During the latter part of the 1970's, the Government of Ghana introduced sports competitions among the schools for the deaf throughout the country. The idea was based on the introduction of the Rehabilitation Act of 1973, and the Education of the Handicapped Act of 1975 (PL. 94-142) by the United Nations and the Commonwealth States. The purpose of this legislation was to provide equal opportunity for every individual with developmental disabilities. The Rehabilitation Act of 1973 is a general civil rights legislation that applies to all social services within the community, as well as within the schools, while the Education of the Handicapped Act of 1975 (PL.94-142) focuses on educational settings and is designed to provide equal opportunity for individuals with disabilities (Auxter et al., 1997).

Also, Section 504 of the Rehabilitation Act of 1973 (the Rehab Act) prohibits discrimination on the basis of disability in any educational institution that receives federal funding and Titles II and III of the Americans with Disabilities Acts (ADA) require programmes and services in public places or that are funded by the government to be

accessible and equally available for individuals with disabilities. Although individuals with disabilities have made significant gains since the passage of these statutes, they still face pervasive inequities in opportunities for physical activity (IFC Policy Briefing).

Individuals with disability Act in Ghana, which was enacted on the 9<sup>th</sup> of August 2006, is to provide for persons with disability and their related matters. The United State Rehabilitation Act of 1973 requires schools to provide fitness; fundamental motor skills and patterns; and skills in aquatics, dance and individual and group games and sports. The right to education is universal and must extend to all children, youth, and adults with disabilities. This right is enshrined in the Convention on the Rights of the Child (1989) and addressed in several significant, internationally approved declarations, including the World Declaration for Education for All (1990), the Standard Rules on the Equalization of Opportunities for Persons with Disability (1993), the UNESCO Salamanca Statement and Framework for Action (1994), and the Dakar Framework for Action (2000).

The goal of the Dakar Framework for Action is to achieve "education for all" by 2015. The goal of Dakar will only be achieved when all nations recognize that the universal right to education extends to individuals with disabilities, and when all nations act upon their obligation to establish or reform public education systems that are accessible to, and meet the needs of, individuals with disabilities.

The first attempt to educate the Deaf was made in 1957 pioneered by an American, the late Rev. Dr. Andrew Foster. It began as an evening class in Christian Borg in Accra. From this small beginning, Government draw inspiration and set up a committee to propose a system of education and rehabilitating the Persons with Disability (PWD) in Ghana, to give them economic and social independence. For the Deaf, the committee

proposed the establishment of a central school for them at Mampong- Akwapim. The school which began in Accra was therefore moved to its new site. The hearing spent ten years for their elementary school education, but the Deaf had to spend three extra years on a preparatory course. Communication in the early school was the manual system through the use of Sign Language and finger spelling. The need to open more schools for the Deaf gained grounds in the early 1970s and therefore a Teacher Training College to train teachers for the Deaf was established in Mampong- Akwapim by 1975. There were ten schools for the Deaf in the country. Those schools for the Deaf are in all ten regions of Ghana. As more Deaf children went through the school, the need arose to have a secondary education for the children. A secondary vocational school was therefore opened at Mampong- Akwapim, alongside another vocational school for the Deaf at Bechem. As the years went by, the Deaf school leavers felt the need to come together to form an association of the Deaf to work for the betterment of their fellow deaf men and women.

The Ghana Association of the Deaf was therefore formed and became an affiliate of the Ghana Federation of the Disabled (GFD). Today there are regional branches of the Association of the Deaf in all ten regional capitals. The Ghana National Association of the Deaf has in recent times enjoyed support from many Non- Governmental Agencies such as Norwegian Association of the Deaf (NAS) and Swedish Organization of the Handicapped Aid Foundation (SOHAF). Many seminars and workshops have been organized in recent years to give leadership and occupation skills to many Deaf young men and women. These seminars and workshops have often been sponsored by these

mentioned Non-Governmental Agencies as well as some voluntary organizations in Ghana.

On 25<sup>th</sup> April, 1998, the Ghana National Association of the Deaf organized a meeting of Parents of the Deaf in Cape Coast to bring them together to fight for the rights of their Deaf children. Leaders of the Association of the Deaf interacted with the parents of the Deaf and promised to have more interaction with the parents in the years ahead. God bless Rev. Dr. Andrew Foster (May his soul rest in perfect peace) and Dr. Seth Tetteh Ocloo the first president of the Association from 1968 to 1977.

The World Games for the Deaf which was sometimes referred to as the: „Silent Games“ and now known as the Deaflympic Games, is the oldest continuing games outside the Olympics. It was started in Paris in 1924, the year in which women were first allowed to officially participate in the Olympic Games. In the maiden games, one-hundred and thirty-three (133) athletes from nine (9) countries gathered in Paris, France, to participate in athletics such as cycling, shooting, swimming and in games such as football, volleyball, table tennis, etc. Due to the introduction of the Deaflympics Games, sports competitions started among the hearing-impaired schools in Ghana. The first, second, third and fourth Annual National Sports Festivals were held at Takoradi in 1979, Kumasi in 1980, Cape Coast in 1981, and Tarkwa in 1984 respectively. But the games had not been held for some time until 2005, due to financial constraints. After Ghana had qualified to participate in the 2005 Deaflympics Games in Melbourne, Australia, the National Deaf sports Festival was rejuvenated and the maiden one was held at Wa, the Upper West Regional capital. It was held for one good week, thus from the 25<sup>th</sup>-30<sup>th</sup> of April, 2005. The schools that participated were from Hohoe, Bechem, Kibi, Cape Coast,



Adjei Kojo (Ashaiman), Jamasi, Mampong, Wa, Savelugu, Koforidua and Gbeogo (Bolgatanga).

It is worth noting that, physical education is a taught subject in Volta School for the Deaf as well as training for participation in games and sports. The teaching of the practical lessons helped the students to acquire basic skills needed for participation in sporting competitions. It also helped them to improve upon their physical performance levels. Thus, motor-skill related fitness and health-related fitness levels. St. Francis Junior Secondary School, on the other hand, had no substantive physical education teacher(s) and as such the subject was not taught as a time table subject. However, during the sporting seasons, physical education teachers from St. Francis College of Education were contracted to assist in training the students for the competitions. At times too, teachers in the school who have interest in sports do help in training the students towards sports competition. This goes a long way in helping the students to improve their motor-skill performance levels. In 2004, the inter-school sports competition hosted by the Hohoe Municipality circuit, Volta School for the Deaf won the volleyball (girls and boys) and the table tennis (girls). St Francis Junior Secondary School, on the other hand won the boys soccer, boys and girls handball and boys table tennis in the circuit.

## **2.2 The Critical Disability Theory**

The origins of critical disability theory can be traced to a larger movement in politics and law that has become disenchanted with the promises of liberalism (Minda 1995). Liberalism, in its most positive manifestations, was able to promote a welfare state, that is, a web of social and economic relations that went beyond formal equality to

facilitate equal opportunity for some. However, liberalism has been unwilling and unable to pursue substantive equality. In response, a number of post-liberal voices-including critical theories, some forms of feminism, queer theory, critical race theory, and critical disability theory-have emerged, identifying both the weaknesses of liberalism and the requirements of a more inclusive democracy (Devlin, 2001).

Critical disability theory interrogates a system of justice that is based on a politics of “just us.” This is why context is so important to critical disability theory, because it is a theory that emerges from the bottom up, from the lived experiences of persons with disabilities, rather than from the top down, from the disembodied ivory tower. But this does not mean critical disability theory does not engage with some of the big questions of philosophy and political theory; it simply means that it comes at them with a sharp awareness of the contexts of inequality based on disability. So, for example, critical disability theory is sceptical of liberalism, not just because it has potential ontological weaknesses (for example, its insufficiently relational understanding of a self) but because of its deep structural assumptions such as its narrative of progress, which many persons with disabilities find hard to imagine given the current context of state downsizing, budget cutting, and retrenchment. The emphasis on power and context also provides a clue to the philosophical origins of critical disability theory. While some authors, for example, argue that liberalism can be given a radical turn, many critical disability theorists build on the insights of critical theory and feminism.

Liberalism’s approach to disability is constrained by limiting normative assumptions. The starting point for liberalism is that disability is about misfortune or bad luck. As MacPherson describes, tort law conceives of a pre-existing condition of

disability as a subtraction from the norm. As Tremain (2006), points out, the notion of prevention is taken so far as to normalize the selective abortion of impaired fetuses. We, as a society, develop and utilize prenatal testing techniques because we have determined that certain kinds of lives are not worth living. Such an appreciation of disability sends a very powerful message to persons with disabilities who are already born. Second, if disability cannot be prevented, the next level of engagement is treatment and cure. This is where the biomedical model of disability is paramount. The disability is located in the individual, and efforts, often extraordinary efforts, are pursued to eliminate the defect and get rid of the disability. Third, if neither prevention nor cure is possible, the last resort is rehabilitation, where assistive devices, prosthetics, medication and/or training the body to function in non-standard ways are used as means of coping with the disability. In this framework, disability is at best tolerated. This does not mean to suggest that prevention, cure, or rehabilitation is, in themselves, bad things. But they are not the full picture.

To start from the perspective that disability is misfortune is to buy into a framework of charity and pity rather than equality and inclusion. To contextualize and conceptualize disability as misfortune is to create a hierarchy of difference-fortune must be better than misfortune. Although liberalism is perhaps naive and simplistic in terms of what is necessary to achieve equality, in other contexts liberalism can, at a fundamental level, readily reject a hierarchy of difference. Relatively early in its development, liberalism was able to reject as both irrational and wrong the notion of privileging one race over another; in liberal thought, racial origins are obviously irrelevant to the entitlement to equality. Gender equality has been more of a challenge to liberalism, because of biological differences between men and women. While liberalism is still struggling to

come to terms with gender difference, and while liberalism is still fixed on the binary conception of gender, the basic premise of gender equality is well established in liberalism.

It is our contention that it is in the context of disability that liberalism has the greatest difficulty in rejecting a hierarchy of difference. In a utopian society, liberalism would not seek to abolish race or gender or sexual orientation. But it would seek to abolish disability, on the basis that human beings are not meant to “suffer” disability. In the practical life of our no utopian society, not only is the abortion of impaired foetuses routine (Tremain 2006), but the murder of a child with a disability, Tracy Latimer, generates a great deal of public sympathy for the father who killed her. Ridding society of disability, that is, ridding society of the defective and inferior other, is widely seen as understandable and perhaps socially acceptable behaviour. On the theoretical plane, Malhotra’s analysis points out that Rawls is quite blatant in expressly excluding the disabled from his social contract model, on the premise that their “fate arouses pity and anxiety” (Rawls 1999, pp 83-84). Similarly, Sampson identifies pity as the core of the Supreme Court of Canada’s approach to gender disability in *R. v. Parrott* (2001).

Equality is not about evoking pity or charity. According to Krogh and Johnson, a charitable approach tends to focus on bare survival rather than on genuine participation in society, and is highly susceptible to claims of budgetary restraint. Rioux and Valentine discuss in detail the theoretical significance of moving from a charity-based approach to a human rights-based approach. To genuinely adopt a human rights approach means rejecting a hierarchy of disability difference, rejecting a privileging of the “normal” over the “abnormal”. But it also entails an engagement with what Martha Minow (1990) has

described as the “dilemma of difference,” that is, when to factor in difference and when to ignore it. Given the diverse nature of different disabilities and the particular impacts a disability may have on different people, as well as the different spheres of life within which a person may operate in any one day, a disability may not have any essential significance. Its significance is contingent on the context. In some situations it will be necessary for both the person with the disability and the larger society to specifically factor in the disability; in other situations, the disability may be safely ignored.

Yet, as a general proposition, disability demands a coming to terms with difference. Critical theory generally challenges the assumption that difference can be ignored. Critical race theorists, for example, challenge the notion (originally in Justice Harlan’s dissent in *Plessy v. Ferguson*) that the American constitution should be colour-blind. They argue that to ignore race is to perpetuate racism. Similarly, radical feminists understand that ignoring gender perpetuates patriarchy (MacKinnon 1989). Substantive equality necessitates taking difference into account in order to both identify the systemic nature of inequality and pursue solutions tailored to the goals of full inclusion and participation. This is even more crucial in the context of disability than elsewhere because to ignore the difference of disability is to engender exclusion. If the sign says that all are welcome, then gender or race is not an absolute barrier to getting in the door, but a set of stairs is an absolute barrier for a wheelchair user. Getting in the door may be a long way from full equality, but it is the necessary first step. Formal equality is inadequate for all equality seekers, but it is most inadequate for persons with disabilities where ablest norms that ignore difference, as well as rigid norms of rationality or reasonableness, can make participation simply impossible. Whereas liberalism says that

difference should be ignored, critical theory demands that difference be confronted. The challenge is to pay attention to difference without creating a hierarchy of difference—either between disability and non-disability or within disability.

Finally, critical disability theory goes beyond political analysis to pursue a politics of transformation. In this regard it asks not only the traditional question of what is to be done, but also, who is to do it? Critical disability theory argues that if we adopt an individualist and essentializing conception of disability, the primary responsibility lies with (in) the person with the disability. Hence, the emphases on prevention, cure, and rehabilitation that we identified earlier. If, however, we understand disability as a socially created barrier, then, as Rioux and Valentine and Baker note, responsibility and accountability shift to the larger community. As one commentator has noted, “A person is a person through other persons” (Kabeer, 2002, p 37). But this shift in the location of responsibility is only a first step. As we have already emphasized in this introduction, a variety of options might be available to the larger community, including pity, charity, surgical intervention, accommodation, and transformation.

At the same time, however, critical disability theory does not want to portray persons with disabilities as passive victims. While there are undoubtedly pervasive structures of inequality, as Krogh and Johnson emphasizes, there are also many and diverse agentic practices developed by the disabled to resist the exclusion and oppression (Lepofsky, 2004). For every moment and instance of “power over,” there are moments and instances of “power to.” As the various contributors have demonstrated, at every level, persons with disabilities have engaged with empowering strategies—at the level of the self; in the family; at school; at work; in local, national, and international politics; in

the social realm; and in the cultural realm. Even in law. Viewed in this light, questions of responsibility and accountability can be resolved only through the joint efforts of both those who are disabled and those who are non-disabled.

### **2.2.1 Philosophical Challenges**

As we have noted, perhaps the most important critical claim with regard to disability is that it is a social construct. Persons with disabilities may experience functional limitations (Granovsky 2000, 703, 721) that non-disabled persons do not experience, but the biggest challenge comes from mainstream society's unwillingness to adapt, transform, and even abandon its "normal" way of doing things. As the Supreme Court of Canada has acknowledged in *Granovsky v. Canada (Attorney General)*, we live "in a world relentlessly oriented to the able-bodied" (Granovsky 2000, pp. 703, 723).

Whether the social construct incorporates just disability or disability and impairment, the point is that the problem is not the person with the disability. Rather, it is the pervasive impact of ablest assumptions, institutions, and structures that disadvantage persons with disabilities. As Justice G erald La Forest has pointed out, "This historical disadvantage has to a great extent been shaped and perpetuated by the notion that disability is an abnormality or flaw. As a result, disabled persons have not generally been afforded the „equal concern, respect and consideration“ that is, 15(1) of the Charter demands. Instead, they have been subjected to paternalistic attitudes of pity and charity, and their entrance into the social mainstream has been conditional upon their emulation of able-bodied norms" (Eldridge, 1997; p. 668). These comments were made in the context of a claim for state funding of sign language interpretation for deaf patients being



treated by doctors or at hospitals, ultimately a fairly modest challenge to the mainstream way of functioning. Where the claim was a more fundamental challenge, claim on behalf of a child with profound disabilities, a child very different from student peers, the court rejected a presumption of integration of students with disabilities in *Eaton v. Brant County Board of Education* (1997).

Similarly, in *Auton v. British Columbia* (2004), arguments that fundamentally challenged the orientation of the health-care system were roundly dismissed. A primary goal of critical disability theory is to force dominant society to break out of the “psychic prison” (McKenna, 1997; 160) of ablest and move toward a barrier-free society (Eldridge, 1997; 689) in which persons with disabilities (both the easy cases and the hard cases) genuinely belong (Michalko, 2002). The claim that disability is not just an individual impairment but a systematically enforced pattern of exclusion moves the analysis forward in important ways. However, it also raises a number of other questions. For example, there may be significant differences between a social model, a social constructionist model, and an oppressed minority model, each of which might characterize the problem, and potential solutions, differently.

There is the question of whether the language of social construction is successful in its attempt to escape the dangers of essentialism. This, in part, is a consequence of a point referred to previously: the complexity and diversity of disabilities. The range of potential disabilities is enormous, so how does one begin to talk about a group characteristic such as disability without slipping into commonalistic claims that reproduce categories of inclusion and exclusion? A number of authors have struggled with this problem, aware



that emphasis on particularism threatens to return us to a medicalized characterization of the circumstances of persons with disabilities.

On the one hand, these analyses appear to be promising because they help us break the stranglehold of essentialism. However, on the other hand, they may resurrect the fear that without some element of commonality, we cannot analyze the patterns of systemic exclusion, never mind mobilize to ensure greater inclusion and participation. These challenges are intensified by Tyjewski's (2006) invocation of the descriptor "hybrids" for those who do not fit nicely into preconceived conventional identity categories.

It is important to remember that disabilities range from the highly visible to the highly invisible. Moreover, whether the disability is visible may depend on the context. For example, although a wheelchair is generally a very visible sign of disability, if someone using a wheelchair is seated at a table with others who did not bring their own chairs, the disability may not be obvious to the casual observer (or to someone who cannot see the wheelchair because they cannot see at all). Many disabilities are not apparent unless specific activities impacted by the disability are being engaged in. For example, in a situation where no one is speaking, muteness or deafness may not be discernible. There are also many hidden disabilities that are not obvious unless the person chooses to disclose, or is required to disclose to qualify for benefits or accommodation, as discussed by Frazee, Gilmour, and Mykitiuk and Hibbs and Pothier, respectively.

The reality of hidden disabilities leads to the possibility (and politics) of passing. If marginalization or discriminatory consequences are associated with being categorized as disabled, there may be an incentive to act as though one is not disabled, that is, to try to elude the social construction of disability. Given the negative connotation attributed to

disability, the able-bodied majority generates an expectation that persons with disabilities should try to pass (Titchkosky, 2003; pp. 66-71). In its purest form, passing is a very deliberate attempt to pretend you are something you are not. People may put a great deal of effort into passing. Rod Michalko, who was diagnosed as legally blind (10 percent vision) at age eleven, describes how he went to great lengths to pass as fully sighted in his high school years. He preferred to attribute his inability to drive to a fictitious, impaired driving licence suspension than to admit he could not see well enough to drive (Michalko, 2002; p. 74).

Even where someone is making no attempt to pass, that person may get caught up in a presumption of normalcy, especially if he or she is not visibly disabled. Most of the time, people are expected to act in an able-bodied way unless there is very specific notice to the contrary. This can have important marginalizing or exclusionary effects. This goes well beyond the issue of intent or denial of access. Pothier (2006) witnessed an example of the exclusionary effects of the presumption of normalcy during her appearance at a court hearing with several other lawyers, one of whom was in a wheelchair. The chief justice was noticeably upset by the breach of protocol when this particular lawyer did not, like the other lawyers, stand up at the start of the hearing when her name was called. After a whispered comment from the judge sitting next to him, the chief justice seemed to understand why she had not stood up, but he gave no acknowledgment of his inappropriate reliance on a presumption of normalcy. Even where the visibility or knowledge of a disability precludes passing in its pure sense, there can be another form of passing. A person with a disability may try to blend in as much as possible, trying to downplay the significance of the disability. This is a process of accommodating oneself

to one's environment, while asking and expecting little or no effort of the environment to accommodate the disability. This is a form of passing that Pothier (2006) now recognizes as a practice of her younger self. The conceptual shift that Pothier (2006) has made in the last fifteen years is to not be satisfied with accommodating herself to her physical and human environment. Rather, she expects the physical and human environment to be welcoming to the presence of disability – hers and that of others.

The foregoing discussions indicate that critical disability theory is not just about the failure of liberalism as a political response to needs of persons with disabilities but also a philosophical challenge to conventional liberal assumptions. Liberalism tends to put great emphasis on the individual, assuming that the self is both sovereign and a foundational unit for analysis. However, critical disability theory forces us to reflect on a number of profound ontological questions. Who is a self? Is there such a thing as an authentic self? What is the significance of disability to the conception of self? Are the answers fundamentally different for those born with a disability than they are for those who acquire a disability after having a previous conception of self? How does the self relate to others? Lee considers, but ultimately rejects, the notion of the disabled as members of a cultural group. Krogh and Johnson and Frazee, Gilmour, and Mykitiuk interrogate how people reconstruct themselves and their sense of self to respond to the dominant norms and expectations of them. As the previous discussion of passing suggests, given the coercive demands of normalcy, are there not enormous barriers to being certain of whom a disabled person might be?

Liberalism also has put great store in the principles of liberty, autonomy, and choice. But once again, critical disability theory invites us to revisit the analytical and

strategic utility of such discursive artefacts. Given the reality that some persons with disabilities will necessarily be in situations of intense dependency and reliance, can liberty and autonomy – with their emphasis on freedom from – really be the lodestars liberalism has assumed? Despite liberalism’s assumption that dependency is the opposite of autonomy, disability may force reconciliation between autonomy and dependence. In other contexts, if a person with disabilities (for example, an autistic child, as Baker discusses) has difficulty, even great difficulty, communicating her or his wishes to others, what work can liberty and autonomy really do? Is “choice” a useful, or realistic, way to discuss some issues of disability? Would a focus on sometimes mutually reinforcing, sometimes competing, coercions provide more insightful analyses and reflections? If it is true, as several authors have suggested, that the language of disability is always and already an exercise in categorization, regulation, and discipline, does this mean that the options are not between liberty and constraint, but between different forms of constraint? Could we not provide more grounded analyses by identifying the competing acts of violence that saturate the lives of persons with disabilities? However, we are also concerned that such a shift in focus and analysis might raise the spectre of paternalism and infantilization. Our goal in making such suggestions is not so much to abandon the discourses of autonomy, liberty, and choice as to decentre them to create space for more context-specific interrogations and analyses.

Critical disability theory (CDT) centres disability as it compares liberalism’s norms and values with their actualization in the daily life of disabled people. Five elements of CDT were outlined: the social model of disability, valuing diversity, rights, and voices of disability, and transformative politics.

### 2.2.2 Social Model of Disability

A theory which centres disability and proceeds from the perspective of disabled people needs to have a conception of disability which is sufficiently inclusive to encompass the population with which it is concerned. What this conception should be and how any definition can avoid being over or under-inclusive is a key concern of critical disability theory. In my view, a „universalist“ conception of disability, which proposes that everyone may be placed on a continuum from disabled to not disabled and argues that disability is universal since everyone is disabled at sometime in their lives, is an insufficient basis upon which to analyse the social condition of disabled people and develop social policy which is responsive to the interests of this very diverse population. This necessitates some, inevitably contested, conception of disability which reasonably identifies the population in question without lapsing into essentialism.

Broadly stated, liberalism has traditionally conceived of disability as personal misfortune preferably to be prevented and definitely to be cured, privileges „normalcy“ over the „abnormal“, presumes able-bodied norms are inevitable, and values economic productivity as an essential aspect of personhood. In the context of CDT jurisprudence, these principles are reflected in how the law and legal institutions respond to disabled people as individuals and as populations which are the subject of various social policy initiatives. The dominant paradigm for understanding disability throughout most of the 20th century has been the medical model which identifies the source of the disadvantage experienced by disabled people as their medical condition. This essentialist model sees disability as an inherent characteristic of a person arising from an objectively identified impairment of the mind or body. In contrast, critical disability theory adopts a version of

the social model based on the principles that: (1) Disability is a social construct, not the inevitable consequence of impairment, (2) Disability is best characterised as a complex interrelationship between impairment, individual response to impairment, and the social environment, and (3) The social disadvantage experienced by disabled people is caused by the physical, institutional and attitudinal (together, the „social“) environment which fails to meet the needs of people who do not match the social expectation of „normalcy“.

In the early days of the social model disabled activists often made the extreme claim that no impairment was disabling: Only the failure of society to accommodate difference limited an individual’s life options. This conception of the social model met the needs of the times -a mighty shove is needed to overcome inertia and without this extreme proposition the medical model may never have been budged. But now the social model is widely accepted and, while recognizing the need to avoid reverting to an essentialist conception of disability, a complete account of disability must incorporate the personal experience of impairment and illness. The CDT version of the social model is the synthesis of the medical and social models which the World Health Organization calls the „bio-psychosocial model.“ This approach balances the contributions of impairment, personal responses to impairment and the barriers imposed by the social environment to the concept of disability.

Public policy must respond to both the biomedical and social aspects of disability. Prevention, treatment and rehabilitation are all appropriate responses to the biomedical, or impairment, aspects of disability. For those people who continue to experience social marginalization despite interventions responding to their biomedical circumstances, the appropriate policy response is to change the social environment. There is, however, an

inherent dialectical tension between the medical model which seeks to abolish disabling impairments and a social model which accepts and truly values disabled people as equal, integrated members of society. Critical disability theory probes this tension by questioning, among other things, concepts of personal independence and interdependence, the social construction of „no disability“ as well as disability, the concept of normalcy, fundamental values of individual dignity and respect in democratic societies, and issues at the intersection of disability with class, gender, race, sexual orientation, ethnicity and other socially constructed categories.

### **2.2.3 Valuing Diversity**

A fundamental value of political and legal liberalism is the principle of political and legal equality. Race, gender, sexual orientation, ethnicity are all differences to which liberalism has had to respond. With race and ethnicity, and to lesser extents gender and sexual orientation, the response has been to deem what used to be relevant differences to be no longer relevant. In this way, political and legal equality could be extended to these claimants without disturbing the basic structures of society. The consequence of this approach is, however, that diversity must be suppressed: The claimant must appear like the comparator or else the claimant is found to be different and thus legitimately subject to different treatment.

For disabled people, however, this approach to responding to demands for political and legal equality frequently will not be a successful response strategy. Disability epitomises Martha Minow's „dilemma of difference“ which arises when it is necessary to decide whether to deal with difference by acknowledging and responding to it or by



ignoring it. Depending on context, equality objectives may be promoted by acknowledging and respecting difference in ways which effectively ignore it or in ways which respond to it. With disability, in most cases, difference should not just be dismissed as irrelevant, because ignoring the difference usually has the effect of rejecting and marginalizing the person. Instead, a response which takes account of the disability so that adjustments can be made to eliminate the obstacle to welcoming the individual and enabling the person to participate as an equal is required.

For critical disability theory being identified, and identifying, as a disabled person is central to understanding one's self, one's social position with its attendant opportunities and limitations, and one's knowledge of the world. CDT recognises and welcomes the inevitability of difference and conceives of equality within a framework of diversity. Any systematic response to disability which purports to make disability invisible is inherently incapable of effectively protecting the rights of disabled people to be full participants in their communities.

#### **2.2.4 Rights**

Despite much scepticism about the relevance of legal rights to disadvantaged groups in society, critical disability theory embraces legal rights as an indispensable tool to advance the equality claims of disabled people and to promote their full integration into all aspects of their society while at the same time valuing and welcoming the diversity that disabled people bring to their communities.

Critical disability theory's central concerns with disabled people's (individual) rights to autonomy and (social) rights to full participation in society are reflected in the



tension between the social welfare and rights-based approaches to disability policy. CDT does not reject liberal rights: it exposes the ways in which liberal rights theory has failed to respond adequately to the needs and interests of disabled people individually and collectively by failing to incorporate the diversity of the disabled community within the scope of its conception of equality.

### **2.2.5 Voice**

Traditionally, the voices of disabled people who contest mainstream conceptions of disability and the potential role of disabled people have been suppressed and marginalized. If one starts with a belief that disability is lack and inability, unchosen and despised, then the voices of disabled people can always be interpreted as symptoms of a person's healthy or unhealthy relation to that disability. When the disabled voice says what the able-bodied perspective wants to hear, it is heard; when it says something the able-bodied perspective does not want to hear, it can simply be dismissed as the inappropriate response of a person who has developed an unhealthy response to the impairment.

Critical disability theory, building on the reflexive approach to social inquiry characteristic of critical theory, privileges the stories of disabled people; it gives them voice. This is not a minor matter. Able bodied people think about disability from their able perspective. For them being severely disabled is imagined as unmanageable suffering, a life subject to constant dependency and without value. It is only by listening to and valuing the perspectives of those who are living disabled lives that the able bodied

can begin to understand that even severe disability does not have to prevent a joyful and desired life.

### **2.2.6 Transformative Politics**

One of the ways in which Max Horkheimer distinguished his critical theory from traditional theory was his insistence that theory must be both explanatory and normative. Changing the economic, political and social structure of society with the objective of emancipating humanity was always the purpose of the Frankfurt School's critical theory. Critical disability theory retains this linkage between theory and practice from its critical theory roots and is „a self-consciously politicized theory. Its goal is not theory for the joy of theorization, or even improved understanding and explanation; it is theorization in the pursuit of empowerment and substantive, not just formal, equality“. CDT is about power and „who and what gets valued“. The policy response to the medical model of disability focuses on preventing and curing disability or providing support for those who do not respond to medical model interventions. In most Western democracies there has been a progressive democratisation of disability related social welfare programmes, but they are still characterised by paternalism and inflexibility. And often democratisation disguises government cost cutting measures which disproportionately impact disabled people and other socially excluded communities. CDT provides the theoretical basis for different policy responses to disability – those being policies of inclusion, equality and autonomy.

While it is obvious that CDT does not suggest that prevention and cure are not important elements of a complete national disability policy, medical interventions and the discourse of prevention and cure both have been highly problematic for the equality and

social rights of disabled people. The capabilities of medical science in the areas of genetic screening, reproductive technology, treatment of premature babies and sustaining life through the use of life support technology, to name a few, are examples of science progressing faster than our moral compass can be reset. CDT, by exposing hidden motivators, identifying how social attitudes are conditioned by the portrayal of disability in the print and visual media, showing that the choices made for the directions and goals of empirical research are the result of contingent social processes and demonstrating the contingent nature of the social construction of disability, provides a theoretical basis for the development of more effective policy responses to disability and stronger, democratic political control of social institutions which deal, in one way or another, with issues related to disability.

Max Horkheimer introduced the term „critical theory“ in his essay “Traditional and Critical Theory”. Since then critical theory has undergone significant broadening in scope and taken on a pluralist complexion. What unites the diverse family of critical theory is that, in all its variations, critical theory looks below the surface of the status quo and seeks „the potentiality for, or desirability of, things being other than they are“. A critical jurisprudence of disability identifies the sources of oppression within the law and also the potential positive role of law in the struggle for the emancipation of disabled people which is the rationale for CDT itself.

Critical disability theory centres disability as it identifies the potential for the social conditions of disabled people to be other than what they are. CDT is based on a social model of disability which recognises disability not as the inevitable consequence of impairment but as a complex socially constructed interrelationship between impairment,

individual response to impairment, and the social environment and that the social disadvantage experienced by disabled people is caused by a social environment which fails to meet the needs of people who do not match a society's expectation of „normalcy“. An adequate conception of equality which supports the political demands of disabled people for full inclusion in their communities must take account of the reality of difference and recognise that sometimes difference must be taken into account, and sometimes it must be ignored, to advance equality. CDT welcomes and values diversity and adjusts the concept of equality to accommodate diversity.

Traditionally, there has been very little room for the voices of disabled people who contested mainstream conceptions of disability and the proper social position of disabled people. CDT privileges the voices of disabled people and relies on their voices to challenge the negative attitudes toward disability commonly expressed by able bodied people and so often reiterated in print and visual media. These attitudes are both reflected in, and reinforced by, the language used to describe disabled people and to describe their disabilities. Critical disability theory is intentionally political in that its objective is to support the transformation of society so that disabled people in all their diversity are equal participants and fully integrated into their communities. CDT provides a conceptual framework to understand the relationship between impairment, disability and society and to inject disability interests into all policy arenas.

In support of the above theory, “The Convention on the Rights of Persons with Disabilities”, an international human rights treaty of the United Nations intended to protect the rights and dignity of persons with disabilities. Parties to the Convention are required to promote, protect, and ensure the full enjoyment of human rights by persons

with disabilities and ensure that they enjoy full equality under the law. The Convention has served as the major catalyst in the global movement from viewing persons with disabilities as objects of charity, medical treatment and social protection towards viewing them as full and equal members of society, with human rights. The right to education is a basic human right and the foundation for a more just society. For this reason, the Convention has been followed up in recent years by a movement that has sought to turn the educational rights of the child into a reality. The movement, Education for All (EFA), was therefore launched at the World Conference on Education for All in Jomtien, Thailand in 1990 by the major international and bilateral organizations and was attended by almost all of the nations of the world including Ghana. For example, 98% of children with disabilities in developing countries do **NOT** attend schools due to their conditions and if they do, they are discriminated against. As a result, the forum declared that Education for All must take into account the needs of the poor and the disadvantaged, which includes, among others, those with special learning needs and assure that Education for All really means **ALL**

### **2.3 The Meaning of Motor Skill-related Fitness**

The term “fitness” means different things to different people, and it denotes dynamic qualities that allow one to satisfy her or his needs regarding mental and emotional stability, social consciousness, adaptability, spirituality and physical health (Prentice, 1999). American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) defines Physical Fitness as a “physical state of well being that

allows people to perform daily activities with vigour, reduce their risk of health problems and establish a fitness base for participation in variety of activities” (Auxter et al., 1997).

Physical fitness is also defined as having the energy and strength to perform daily activities or tasks vigorously and alertly without getting “run down” and still having enough energy to enjoy leisure-time activities and meet emergency demands (Sherrill, 1993). Again, according to Sherrill (1993), when you are physically fit, your heart, lungs, and muscles are strong and your body is firm and flexible. Your body weight and percentage body fat are within a desirable range. According to Microsoft Encarta Encyclopaedia (2004), Physical Fitness is the ability of the human body to meet demands imposed by the environment and daily life. Fitness is a state of the body that helps to develop a more positive and dynamic attitude of life and is likely to affect most phases of human existence. Efficiently working lungs and heart, general alertness, muscular strength, energy and stamina are the overt symptoms of physical fitness. Prentice (1999) also defines fitness to mean that the various systems of the body that are healthy and function efficiently so as to enable the fit person to engage in activities of daily living as well as in recreational pursuits and leisure activities without unreasonable fatigue.

The motor skill-related physical fitness is defined as the traditional concept of optimal strength, power, coordination, agility, reaction time and balance for sport functioning and in the case of many handicapped persons, for daily living (Auxter et al., 1997). Motor skill-related or performance-related physical fitness consists of those components of physical fitness that have relationships with enhanced performance in sports and motor skills. The components are commonly identified as agility, balance, coordination, power, speed and reaction time. According to Siedentop (2001), Physical

Fitness is pursued by people in many different areas including schools, health spas and sport clubs, weight training centres, Young Men Christian Association (YMCA) or Young Women Christian Association (YWCA) facilities, recreation centres, and even homes.

Components of motor skill-related physical fitness are called skill-related, because people who possess them find it easy to achieve high levels of performance in motor-skills, such as those required in sports and in specific types of jobs (Corbin, Lindsay and Welk, 2000). The skill-related components are agility, balance, coordination, power, speed and reaction time. Many of these components work closely together. However, specificity does exist and such skills cannot be categorized in general. A combination of these skills or abilities usually determines a skilled performance in a particular sport. It is noted also that a high level of health-related components, may make skill acquisition easier. One cannot improve if one is fatigued/tired and lacking strength or flexibility. Also each part of motor skill-related fitness is multi-dimensional (Corbin et al., 2000).

The ABCs of skill-related fitness are commonly referred to as the ability to change direction quickly and to move efficiently as possible with minimal energy expenditure. These three components can be improved or developed by the use of developmental training programmes, specific exercises of drills and sports participation. Some experts contend that strength is the most important factor in agility, since a stronger body moves with more ease and efficiency. Flexibility is most important to balance and coordination by increasing one's range of motion. Agility-type drills should involve a



number of direction changes, place the performer in a variety of body positions and be of short duration so fatigue does not become a factor (Auxter et al., 1997).

There is no substitute for sports skill training. Practicing a skill for a specific sport is necessary to improve. No amount of conditioning will alternate for skill training. Sports participation also develops skill-related physical fitness. Activities like handball, racquetball, basketball, gymnastics, wrestling, volleyball, tennis and soccer are few of many activities that could be used for motor skill development. Possessing a moderate amount of each component of health-related fitness is essential or necessary to disease prevention and health promotion, but it is not essential or necessary to have exceptionally high levels of fitness to achieve health benefits (Corbin et al., 2000). High levels of health-related physical fitness relate more to performance than health benefits. For example, moderate amounts of strength are necessary to prevent back and posture problems, whereas high levels of strength contribute most to improved performance in activities such as football and jobs involving heavy lifting. The components of health-related and motor skill-related physical fitness overlap. For instance, cardio-respiratory endurance, muscular strength, flexibility and body composition are essential for healthy living. They are also important in skilful motor performance. However, the degree of development each requires varies according to the type of physical activity. A more extensive development of these components may be required to achieve an appropriate level of motor skill-related physical fitness, which is often associated with sport. For example, athletes may need to develop speed and power to a greater degree than most individuals who are interested solely in improving and maintaining health-related fitness (Prentice, 1999). Thus, participating in activities to improve physical fitness enhances



one's attitude about life, enhances his/her ability to perform activities of daily living, enhances sports and leisure skills and improves and maintains health. It is also worth noting that, what we do with our bodies affect what we can do with our mind, thus physical fitness influences qualities like mental alertness and emotional stability. It is assumed that people who possess skill-related fitness will be more likely to engage in regular activity, and for this reason will have enhanced health-related fitness and a lower risk of hypo-kinetic diseases and condition.

Skill-related fitness components are assessed with performance measures. Such components as reaction time and speed are considered by some to be more related to heredity than healthy lifestyles; especially in children. Physical activity provides performance benefits above and beyond the benefits of health. These performance benefits can promote quality life for the normal human adult and enhance the abilities of athletes and people in jobs requiring high level of performance (Corbin et al., 2000).

Possessing high levels of the primary components of motor skill-related physical fitness (agility, coordination, balance, reaction time, speed and power), makes it easier to learn the skills important to high-level performance. However, there are other abilities that also contribute to performing skills. For example, many experts consider various perceptual abilities such as depth and distance perception (ability to judge depth and distance accurately), and visual tracking (ability to visually follow a moving object), to be skill-related parts of physical fitness (Corbin et al., 2000). As an individual might possess ability in one area and not in another and for this reason, general motor ability probably does not really exist. Individuals do not have one general capacity for performing. Rather, the ability to play games or sports is determined by combined

abilities in each of the separate skill-related components. It is however, possible and even likely that some performers will be above average (Corbin et al., 2000).

## **2.4 Fitness and Disability**

Fitness is a family or socio-cultural phenomenon and societal expectations partly determine fitness aspirations for self and others. According to Sherrill (1993), persons with disability and health impairment obviously have to work harder at fitness than more fortunate peers. Because this process often takes far longer than average and demand considerable perseverance, the benefits of fitness must be clear. Developing and maintaining an appropriate level of physical fitness is critical for persons with disabilities because, frequently, the disabling condition itself interferes with the ability to move efficiently (Getchell, 1993). Physical fitness activities for people with disabilities must be individually tailored or structured to abilities and the severity of the condition. The goals of the activities among persons with disabilities will vary depending on the type of impairment and will differ from that of individuals with no impairment.

## **2.5 The Role of Sport and Adapted Physical Activity for People with Disabilities**

Sport can play a key role in the lives and communities of people with disabilities, the same as it can for people without a disability. Sport encompasses all forms of physical activity and includes play, exercise, recreation, organised, casual or competitive sport and indigenous sport or games that contribute to physical fitness, mental well-being and social interaction. There is a wealth of evidence to support participation in sport and

physical activity for people with a disability concerning trends, barriers and benefits of participation.

Over the past three decades, research efforts have developed significantly in the area of disability sport and adapted physical activity. Numerous studies have revealed that physical activity and sport participation result in improved functional status and quality of life among people with selected disabilities. Scientific research has been conducted across disability groups that reveal participation in sport and physical activity leads to improved levels of physical health and well-being. Sport and physical activity has also been shown to improve physical fitness and general mood in psychiatric patients with depressive and anxiety disorders. Additionally, sport and physical activity have been linked to improvements in self-confidence, social awareness and self-esteem and can contribute to empowerment of people with disabilities.

In developing countries, people with a disability often face additional barriers to participation in sport and society and these may include for example, complex issues including attitudes towards disability, traditional and religious beliefs, physical education systems, and access to sporting infrastructure including services, facilities and equipment. Integration and inclusion of people with disabilities in mainstream sport has been a key focus in recent decades and has created new opportunities for participation and competition. On a larger scale, participation in disability sport also contributes to nation building and national identity and can also promote rehabilitation of people with disabilities following natural and man-made disasters.

## 2.6 Barriers to Participation

On an individual level, people with a disability may face a number of additional barriers to participation in sport compared with people without a disability. Some common barriers include:

- Lack of early experiences in sport (this varies between individuals and whether a disability is from birth or acquired later in life)
- Lack of understanding and awareness of how to include people with a disability in sport and physical activities
- Limited opportunities and programmes for participation, training and competition
- Lack of accessible facilities, such as gymnasiums and other infrastructure
- Limited accessible transportation
- Limiting psychological and sociological factors including attitudes towards disability of parents, coaches, teachers and even people with disabilities themselves
- Limited access to information and resources

Regarding participation of developing countries in international sports there is a widening gap between developed and developing countries. This gap has been linked to a shortage of physical education and sport for all programmes, a lack of financing for sport, few sport facilities and limited equipment, a „muscle drain“ to developed countries, and no capacity to host major sporting events with the result that developing countries have fewer world-level sport performances than developed countries.

Limited access to sport services, sports information and the issue of doping are becoming increasingly problematic. Developing countries also face a range of social and cultural barriers that impact on sport participation including: religion, culture, language,

and the lingering influence of colonialism in many parts of the world. Listed together these barriers may appear insurmountable but it is important to recognise that not every person will experience all of these barriers. In the interest of facilitating active participation from people with a disability in developing countries, the potential impact of these barriers should be taken into consideration.

There is limited research that explores the specific barriers to participation in sport for people with a disability in developing countries. Much more evidence is needed along with financial support to ensure that people with a disability have both the opportunity and the choice to participate in sport regardless of which country they live in. There is a need to develop appropriate opportunities for people with disabilities throughout their life course. The provision of access for people with disabilities to quality physical activity and sporting opportunities must be addressed on an equal basis with those of their non-disabled peers. The access of people with disabilities to physical exercise, through recreational and competitive sport and physical education curricula, must be planned for and incorporated into all structures, strategies and programmes. These include community facilities, leisure and sporting venues; national, regional and local strategies and public awareness campaigns; physical activity and sports programmes in schools and in the community.

Barriers that contribute to low levels of participation in physical activity and sport by people with disabilities in Ireland include the following: poor physical education (PE) provision in schools; negative school experiences; low expectations from teachers, families and peers; lack of knowledge of what is available; lack of information and expertise; poor community facilities and lack of access to facilities and programmes; ad

hoc structures and approaches; transport difficulties; lack of coverage of a wide range of sports in the media; lack of experience of the benefits of physical activity; untrained staff and lack of accessible facilities; lack of companions who can facilitate/assist people with disabilities to access facilities and programmes when required; inadequate sponsorship and coaching; and a lack of a culture of general participation in physical exercise and sport in Ireland (“we are becoming a spectator nation”). Only coordinated and concerted efforts will be successful in addressing this complex range of barriers.

From the empirical research for this study five main factors emerged as essential if quality experiences in physical exercise and sport are to be had by people with disabilities. These are stronger leadership; improved and inclusive community facilities including playgrounds; the provision of adequate PE and physical activity experiences in the school and in the community; adequate and accessible information services; and comprehensive education, training and coaching programmes that provide PE teachers, coaches, trainers and managers with the required inclusive PE, sport and physical activity training and expertise. While there have been welcome developments in the area of sport and active leisure in Ireland including an increase in funding for sport and active leisure, the importance of leadership to spearhead the construction of appropriate structures and processes cannot be overstated. Participants in this study, including people involved in sports and physical exercise provision, people with disabilities and parents of children with disabilities, considered the issue of leadership to be a crucial one. It is perceived that Government Departments, the Irish Sports Council, governing bodies of sports and other relevant organisations could be more strategic in promoting co-ordination, access and equity and improving physical activity experiences for all.

Developing countries have much to learn from the success of umbrella organisations for disability sports in other countries such as the Federation of Disability Sport Wales (FDSW) in Wales, the English Federation of Disability Sport (EFDS) in England and the Australian Sports Commissions Disability Sports Unit (DSU). In these initiatives, while each group retains its identity, united they have a more powerful voice to lobby for funding and support. The success following on the changes spearheaded by these new organisations and structures is impressive. The development of more organised approaches to sport and physical activity equity has led to improvements, in some cases, dramatic, in terms of participation, quality experiences and achievement. The increase in participation together with success at the level of competitive swimming in Wales for people with disabilities after the implementation of a community and competitive swimming programme is a striking example.

While the approaches are diverse in different countries, all involve stronger leadership and improved co-ordination at a national level. In Wales for instance, development of structures has been through local authorities that have taken ownership of ensuring sports equity. In Australia the National Sports Body has a Disability Sports Unit (DSU). The DSU provides practical assistance and a national network of disability education and support personnel who work with National Sports Organisations and other sports providers. Adequate leadership at a national level leads to a cultivation of the culture and required conditions that supports equality of opportunity in the field of physical activity, active leisure and sport. This has facilitated the development of effective partnerships and mobilised the necessary resources. In Ireland there is a need for a united front among organisations and service providers in order to achieve quality



experiences and sports equity for all. More co-operations between the various sectors and groups involved in the development and delivery of sport and physical exercise opportunities should be a prominent goal.

How to ensure physical literacy was another key issue flagged by people with disabilities, parents, and teachers and by professionals involved in the provision of physical activity and sports programmes. Physical literacy is defined as developing the fundamentals of movement through appropriate opportunities and environments for learning and attainment (Bickerton, 2005 citing Stafford, 1995). Understanding that physical literacy is taught, rather than just developing naturally, is central to understanding that sporting ability is controllable rather than pre-determined (Bickerton, 1995). The Physical Education curricular should continue to be modified and the impact and outcome of modifications monitored until PE is of sufficient quality and quantity to ensure that everyone acquires physical literacy.

The education and training of professionals involved is an important related issue. Once people are educated and trained appropriately, inclusive PE is more likely to happen because the professionals will have acquired the skills to organise, modify and adapt curricula appropriately to meet individual need. The opinion was voiced by both parents and teachers that the ongoing in-service training in the primary schools as part of the implementation of the new primary school PE curricula is unlikely in itself to address all the gaps in current PE provision. Until the personnel delivering PE are adequately trained and professionally prepared at both undergraduate and postgraduate level to provide inclusive PE, programmes in schools that will ensure the physical literacy of children and young adults cannot become a reality.



More effective use of the comprehensive National Council for Curriculum and Assessment (NCCA) Draft Guidelines for teachers of students with learning difficulties (2002) would be beneficial. This might be done through the provision of training for teachers on the guidelines. This could be carried out in a number of ways including e.g. a visiting service to train management and staff on their use. Guidelines for teachers of students with physical and sensory disabilities would also be useful.

Increasing knowledge about the range of factors that affect people with disabilities participating in physical activity and sport can be used to develop inclusive physical activity and sports programmes. A multi-agency approach is required. Interventions that promote and facilitate physical activity and sport by tackling the whole range of factors involved necessitates multi-agency involvement including the Departments of Education and Science; Arts, Sport and Tourism; Health and Children; Transport and the Environment together with other relevant departments and public and private agencies. Simply ensuring that adults and children with disabilities can attend the same facilities as non-disabled people is not sufficient in itself to guarantee inclusion. Staff knowledge, attitudes and training for example are very important, as is the requisite assistance throughout the activities.

In summary, the importance of sport and physical activity must be underlined by strategic action at national, regional and local levels. Social commitment and an appreciation of the benefits to society of diversity is promoted and fuelled by clear national policy and frameworks and co-ordinated strategic planning. Clear leadership at a national level makes widespread social commitment to equity for everyone more likely. Long-term plans on how to provide adequate school and community facilities and

programmes as well as comprehensive Physical Education and sport education and training are crucial. Positive experiences and the acquisition of physical literacy at the early learning stages facilitate positive self-concept with regards physical activity and makes lifelong interest and participation in physical activity and sport more likely.

## **2.7 The Participation of People with Hearing-impairment in Sports Activities**

The sports skills of deaf and hearing athletes span the range found in the hearing population, from unskilled to highly skilled. Physical educators have the extremely important role of introducing students to sports, both hearing and deaf (Winnick 1995). The Deaf Olympic Games are among the world's fastest growing sports events. About 3,000 deaf athletes from about eighty (80) nations participated in the 20<sup>th</sup> Summer Games in Melbourne, Australia in January, 2005. Approximately 300 athletes from twenty (20) nations are expected to qualify for the 16<sup>th</sup> Winter Games to be hosted by Park City, Utah in the USA in 2007 (Pinchas, 2004). The first games, known as the International Silent Games, were held in 1924 in Paris. They were the brainchild of Eugene Rubens-Alcais, himself a deaf and President of the French Deaf Sports Federation. The games have been built on 81 years of tradition. The games have been organized since 1924 by the Comité Internationale de Sports de Sourds, (the International Committee of Sports for the Deaf) or CISS. A time when societies everywhere viewed deaf people as intellectually inferior, linguistically impoverished and often treated as outcasts, Monsieur Rubens-Alcais envisioned the international sports event as the best answer. Antoine Dresse, a young deaf French student, was instrumental in helping him accomplish his dream (Pinchas, 2004). The competition at the games immediately became the social context for countries

to deliberate about similarities and differences in the welfare of their deaf people. Over the years, the games have been awarded with the aim of spreading these deliberations into new areas.

Misconceptions about deaf people persist to this day in many parts of society and around the world. But inroads are being made in the battle against prejudice, as more nations and individuals join in the Deaf Olympic Games (Deaflympics) movement and more games are held. The silent games were the first ever for any group of people with disabilities. After the initial Paris games, deaf sporting leaders assembled at a café in Paris and established Le Comité Internationale des Sports Silencieux (the International Committee of Sports for the Deaf) (Pinchas, 2004).

The Deaflympics are distinguished from all other International Olympic Committee (IOC) sanctioned games by the fact that they are organized and run exclusively by members of the community they serve. Only deaf people are eligible to serve on the CISS/Deaflympics board and executive bodies. Participants in the first games arrived from nine European countries. Today, the number of national federations in the CISS membership has reached ninety-four (94) including Ghana. Among relative newcomers enjoying the benefits of this worldwide network of sports and social inclusion, are such geographically despised countries as Mongolia, Bangladesh, Cyprus, Estonia, Uruguay, Iceland and Swaziland (Pinchas, 2004).

Nineteenth Summer Games have been held since the initial Paris games with 145 athletes. No games were held between 1939 and 1949, because of World War II. The first Winter Games held in Seefeld, Austria, in 1949, with 33 athletes from five countries. The first games outside Europe were the Summer Games held in Washington D.C in the

USA in 1965 (Jamie, 2005). The need for separate games for deaf athletes is not just evident in the number of participants. Deaf athletes are distinguished from all others in their special communication needs on the sports field, as well as in the social interaction that is an equally vital part of the games. The International Olympic Committee (IOC) sanctions the games, but unlike the athletics in all other IOC sanctioned games, including the Olympics, the Paralympics and the Special Olympics, the Deaflympians cannot be guided by starter's guns, bullhorn commands or referee whistles. Nor can they experience the crucial sense of inclusion in other general games, because they cannot just strike up a conversation or in other ways communicate instantly or in a practical manner with fellow hearing athletes. However, the Deaflympians depend mainly on signals as commands (Jamie, 2005). For these and other reasons, the Deaflympics Game must and will continue to go on independently, while building on their rich traditions and continuing their rapid growth in scope, size and importance. Increasingly, they also serve as a bridge between athletes brought up in the traditional schools for the deaf children and the increasing number of deaf athletes from mainstream educational institutions (Mackenzie, 2004). The name for the international games for the deaf was changed to Deaf Olympics Games (Deaflympics) to resemble the Olympics, in 2001, in Rome, Italy.

The Summer Deaflympics competitions are held every four years. The first World Games for the deaf had less than 200 contestants from less than 10 countries. Modern Deaflympics events feature thousands of deaf and hard-of-hearing athletes from multiple countries. Although the Deaflympics Games are recognized by the International Olympics Committee, it does not receive any financial support from the IOC (Jamie, 2005). Some countries pay for their deaf athletes to participate, but others do not and this

forces the deaf athletes in most countries to engage in fundraising. Many newspapers and journals publish the plight of the deaf athletes. The qualification standard to participate is very flexible. An athlete only needs a hearing loss of at least 55 decibels in the “better ear” (Jamie, 2005).

According to Winnick (1995) as far back as 1883, deaf athletes were competing professionally in the United States of America. In that year Edward Dundon became the first recorded deaf professional baseball player. For years, the deaf community has been lobbying to get some of their members into the Hall of Fame. One of such notable National Baseball players was William “Dummy” Hoy. Hoy, who was born hearing, but lost his hearing as a young child, is one of the more historic figures in baseball history. Among other things, he was the first one to hit a “grand slam” in the American League. Hoy was also instrumental in the invention of umpire hand signals (Jamie, 2005). He was honoured with a two-front-page in “Deaf Life Magazine”, published in November and December, 1992. In addition, he was featured in episode number 102 of the Gallaudet University – produced television series, Deaf Mosaic. In September, 1997, Hoy was voted into the Ohio Baseball Hall of Fame (Jamie, 2005).

One other very important person in deaf sports was Nathan Zimble, a near Olympian in wrestling. In his hey days, both as a wrestler and as a wrestling coach, Nathan Zimble was the best. He was such a great wrestler for the Gallaudet University team in the early twenties, that he was invited to try out for the USA Olympic Team in 1920. The tryout took place at the old Madison Square Garden in New York, and he finished second place in his weight class. And as wrestling coach at Arkansas School for the Deaf (ASD), he produced an endless assembly line of state wrestling champions

(Strassler, 1999). It is little known that the history of girls and women with disabilities in competitive sports dates back to the early 1900s and has continued throughout the 20<sup>th</sup> century. For the most part, this history is somewhat difficult to trace separately from the general history of disability sports, which until recently, was nonspecific in terms of gender, race, ethnicity, and type of impairment (Depauw, 1999).

Female athletes with hearing-impairment and deafness have also excelled in sports. In the broadest sense, the female athletes with disabilities including hearing-impairment are found not only in the history of disability sports, but also in the history of able-bodied sports (Depauw, 1999). One of such great female athletes was Kitty O'Neil. She earned the title as the fastest woman on earth for her women's world speed records in water-skiing, rocket-powered car driving, and quarter-mile car speed record (Winnick, 1995).

Eva Chalom and her hearing partner Mathew Gates competed in the world Figure Skating Championships. The two were ranked second in the USA. Chalom and Gates danced their way in skates to place 18<sup>th</sup> in the ice dance event. The world Figure Skating Championships were held in March, 2004, in Switzerland (Winnick, 1995). Lauren Peffrs has been backed to be the first deaf person to represent Great Britain in mainstream athletics.

The Women's Sport Foundations recognized Model Secondary School for the Deaf (MSSD) student Tamara Suiter with a Scholar Sportswoman Award at a ceremony in Washington D C, on February 4, 2003. Suiter was selected for her outstanding performance in volleyball, basketball and softball, while maintaining a high grade point average (Flanigan, June 24, 2003). The National Girls and Women in Sports Day were

established in 1987 by a congressional resolution to celebrate the achievement of girls and women in sports. It is celebrated in all 50 states with community-based events, awards ceremonies, and other activities (Flanigan, June 24, 2003). “Tamara was born to play volleyball,” said her MSSD coach Lynn Ray Boran, “she has been a key player on MSSD’s varsity volleyball team since 1995. She’s the backbone of our team. She used her leadership to keep our team together. This year she made a record 519 assists, breaking her own former record of 433 (Flanigan, June 24, 2003).

Tamara was selected as one of ten Independent Schools League (ISL) all-league players and won all tournament awards at both the Fredericksburg and Model Classic Tournaments. In addition to volleyball, Suiter had won awards in softball and consistently achieved academic honours. She had been on the honour roll since ninth grade, has a 3.3 grade point average and was vice-president of the junior class. Suiter balanced her commitment to sports and academics through careful planning, “I love volleyball, but it’s tough to find time for practice and study. I have managed to learn how to reduce my „free time“ and increase my study hours,” said Suiter. My parents were the ones who kept emphasizing the importance of time management. “May be her ability is genetic,” said her father, Ricky Suiter. “Her grandfather was a Hall of Fame athlete at the Illinois School for the Deaf and was awarded Player of the Year by the famous father of deaf athletics, Arts Kruger (Flanigan, June 24, 2003).

The scholar sportswoman award adds to a growing list of Tamara’s honours. The previous summer she won the Youth Leadership award at the 1997 Leadership camp sponsored by the National Association of the Deaf. In February, 1998, she won a place on the Deaf Olympic snowboarding team at a competition held in Jackson Hole, Wyoming.



The team of five women and six men competed in the 1999 World Deaf Olympic Games in Davos, Switzerland. Tamara plans to pursue volleyball at the collegiate level. “I am planning on applying to Gallaudet, I was born and raised to go to Gally!” she exclaimed. Alabama School for the Deaf (ASD) almost won its basketball games. Both boys and girls had several winning seasons, but got eliminated in the playoffs. Under Coach Don Hackney, the boys won thirty-two (32) and lost only two (2) games, including matches with hearing institutions. Wins included important championships like the Mason Dixon Schools for the Deaf Tournament, the area championship, the sub-regional championship, and the Northeast regional championship (Flanigan, June 24, 2003). Before they realized it, the boy’s team found itself competing among the final four teams battling for the state class 1A championship. It was a first in Alabama’s history. Unfortunately, the dream ended in the semi-finals. A crowd of 7,500 fans watched as Loachapoka, the states number 1 – ranked team proved too strong for the Alabama team, winning 56-40. The team played with the heart, rather than height. The tallest ASD was 6’3” compared to the average 6’7” of the Loachapoka players. According to Susana M. Flanigan, a columnist in the Nugget Newspaper, Alabama racked up the most wins of any deaf school in history. Three players, Terry Crumpton, Robert McKinnon and Henry Dorsey were described by coach Hackney as the best in the nation. The girls posted a 293 record, another record high for wins in a season by girls’ deaf high school team. And they did it despite losing two key players to injuries.

Basketball star Michael Torres, skier Jenny Locy and swimmers Zeb Jenkins and Brett Staugger were the top athletes who represented the United States of American at the Summer World Games in 2001, in Rome, Italy (Flanigan, June 24, 2003). Some other



deaf players also excelled in organized sports where communication is a very important factor. One of such players was Kenny Walker. According to Jamie Berke, a columnist in Your Guide to Deafness/Hard of hearing newsletter, Walker who became deaf at two from meningitis, had a short, but interesting football career. First he was an All-American player on the University of Nebraska Cornhuskers, and then picked up by the Denver Broncos where he played for almost five years. He also had a short stint with the Canadian Football League, before retiring from football. He became a football coach at the Iowa School for the Deaf (ISD) (Jamie, 2005).

The 6'4" 290 pound former Bronco has already made his mark. At previous year's student/staff basketball game, Walker helped the staff to a slight win and shattered the glass basketball backboard with a high-powered dunk. (Flanigan, June 24, 2003). One other such player was Curtis Pride. Pride, deaf at birth from rubella and a native of Washington, played basketball and baseball. He started as a soccer star and he played for the United States of American at the FIFA World under- 17 Championship in China in 1985 (Jamie, 2005). Fencer Frank Bartolillo is one of the few deaf athletes to compete in the able-bodied Olympics, believing he has an advantage when competing. Bartolillo was a member of the NSWIS individual Scholarship Programme for Athletes with Disability, and was to become one of only a handful of deaf athletes to have ever competed at the games. The 28 year-old who made his Olympic debut in Athens, 2004, and was one of the three fencers selected to represent Australia at the games, where he contested in the foil competition. Bartolillo qualified Australia for the event in Athens after finishing the 16<sup>th</sup> at the 2003 World Championships in Cuba (Jamie, 2005).

Great Britain's Diver Toney Ally was selected to compete in the 3-meter diving competition in Athens, 2004. Tony competed in the dramatic finals of the 3-meter synchronized finals with partner Mark Shipmen, finishing 5<sup>th</sup> overall at the World Championship in March, 2004. They also competed in the finals at the Sydney Olympics, but unfortunately missed out on a medal and finished 11<sup>th</sup> (Flanigan, June 24, 2003). The 31-year-old Ally, who grew up in Catford, in South-east London, admits he might have ended up in prison, if he had not decided to focus on diving. He was diagnosed with a hearing disorder as a child and lost his brother at the age of nine. Ally hit the headlines in Atlanta, in 1996, when he sold his Olympic kit to raise money. But his career was almost ended two years later when he had a motorbike accident, while on holiday in Italy, which destroyed the muscles in his right arm (Jamie, 2005). Ally bounced back in Seville, in 1999, to become the first British diver to win a European championship gold medal (Jamie, 2005).

Deaf swimmer Terrence Perkins of South Africa took silver medal in the 200m breaststroke at Sydney Olympic Games, in 2000. In Athens, 2004, he competed in the 100m breaststroke and took the 29<sup>th</sup> place in a time of 1:03.05. In the 200m breaststroke, he took the 12<sup>th</sup> place in the semi-finals, in a time of 2:13.58. And in the 4x100m individual medley (relay), Terrence swam the breaststroke leg. Terrence Perkins broke five world records and distinguished himself by becoming the individual to win the most medals at a World Games for the deaf. Terrence won five gold and two silver medals (Jamie, 2005).

The 18<sup>th</sup> World Games for the Deaf took place in Copenhagen, Denmark, in 1997, with more than 60 countries participating. The Games took place under the auspices of

the International Olympic Committee (IOC). The opening ceremony was attended by the President of the IOC, Mr. Antonio Samaranch, who brought a special message on behalf of the IOC. South Africa participated with a team of 30 athletes and the participation was made possible through a contribution of the National Olympic Committee of South African and further contributions by the athletes themselves. Over and above the outstanding performance of Terrence Perkin, another South African, Silvia Kauahuma, won two bronze medals in the athletics – thus, 100 and 200 metres. Other South African athletes contributed with three 4<sup>th</sup> positions, one 5<sup>th</sup>, one 7<sup>th</sup> and 8<sup>th</sup> positions (Jamie, 2005).

Terrence Perkin broke the World Record in 200m freestyle, 100m breaststroke, 200m backstroke, 200m breaststroke and 200m individual medley for which he took gold medals. He was named best male swimmer of the 2002 South African Championships. In 2001, he was named International Committee of Sports for the Deaf (CISS) Sportsman of the Year. In 1997-1998, he was named World Deaf Sportsman of the Year. Terrence also holds the Deaflympics World Records in 200m freestyle, 200m medleys, 400m medley and 200m breaststroke (Jamie, 2005).

A veteran of four Olympics, former World Champion Juri Jaanson quit the sport briefly in 2002, thinking his elite rowing days were over. But after a reunion with Igor Grinko, his former Soviet coach, Jaanson's career had been on the upswing. He had never won an Olympic medal, and Grinko said, "That's what drives him". Still, his chances of winning Estonia's first Olympic medal in rowing were slim. At the final World Cup regatta of the 2004 tour, Jaanson was forced to scratch, because of a cold. Not long, at the Holland Beker regatta in Amsterdam, he fell from his boat during a race. He said he had

seen fish jumping earlier in the day and believed one hit his oar, causing him to lose control.

In four Olympics, Jaanson advanced to two finals, in 1992, when Estonia made its first Olympic appearance since 1936. He finished fifth and added a sixth in 2000. After winning a silver medal at the 1995 World Championship, Jaanson bombed at the Atlanta Games, finishing last in the final for 18<sup>th</sup> place. The final in Sydney was the one he had qualified for at a major championship since 1995. Jaanson won a World title in the singles in 1990, defeating perennial runner-up Vaclac Chalupa of the Czech Republic (Mackenzie, 2004).

Hugo Passos, a deaf-athlete from Portugal, competed in the men's Greco-Roman 60kg wrestling category at the Athens Olympic Games in 2004. He lost to James Gruenwald of the United States of America and Eusebiu Iancu Diaconu of Romania at the elimination pool (Mackenzie, 2004). Some deaf individuals prefer to enroll in residential or day schools providing segregated programmes and the individual will have opportunity to participate in an extensive array of athletic and social programmes. According to Auxter et al., (1997), Gallaudet University provides evidence of success in segregated school programmes. This well-known university for the deaf routinely competes successfully against the hearing in baseball and soccer.

At Gallaudet University in Washington, the only liberal arts college in the world for deaf students' interest in athletics is so high that men and women engage in several intercollegiate sports (Sherrill, 1993). According to Sherrill (1993) the Gallaudet Modern Dance Group has performed in Europe and throughout United States of America. The majorities of audiences are composed of hearing people, but the dancers are deaf.

The Wisconsin School for the Deaf in Janesville, Wisconsin, is nationally known not only for academic excellence, but for athletic excellence as well. Athletes from the Wisconsin School for the Deaf, make regular appearance in the Wisconsin Inter-Scholastic Athletic Association post-season tournament play in football, wrestling and track and field events (Auxter et al., 1997). It is also worth noting that Kentuckian Bobbie Seth Scoggins, a silver medallist in the 1973 and 1977 Deaflympics, joined a number of other world-class athletes who were among the 480 people across America honoured as torchbearers for the Athens 2004 Olympic torch Relay. Scoggins, executive director of the Kentucky Commission on the Deaf and Hard of Hearing was president of the United States Deaf Sports Federation and a member of the USA Olympic Committee. She completed a quarter-mile leg of the first global torch relay in St. Louis, as the Olympic flame passed through the country during a four-day tour.

## **2.8 The Participation of People with Hearing-impairment in Sports Activities in**

### **Ghana**

Ghana's Deaf soccer team Black Wonders on Sunday, June 6, 2004, spanked their Nigerian counterparts 5-0 to qualify to meet South African for the single African slot for the 2005 Deaf Olympics Games in Melbourne, Australia (Graphic Sports, 8<sup>th</sup> June, 2004, p. 4-5). Ghana Black Wonders made a prey on their South African counterparts with a 7-0 drabbing to pluck the African second leg qualifier at the Accra Sports Stadium.

The Black Wonders, the national deaf football team had to overturn a 1-2 deficit suffered in the first leg in South African to win 8-2 on aggregate to sink the South African beyond recovery. The Ghanaians who were paired alongside Italy, United States

and Turkey played a well-composed game, which saw the trio of Opuni Samuel, Godfred Baffoe, and Isaac Agyeman striking twice each with substitute Godwin Oti Ampong scoring the last goal to finish the demolishing exercise (Ghana News Agency, September 12, 2004).

Ghana's deaf national soccer team, the Black Wonders, failed to exhibit their wondrous character when they lost 2-0 to their counterpart from Turkey, in their last group two match played at green gully reserves pitch 2, in Melbourne, Australia (Ghana News Agency, Saturday, Jan. 8, 2005). By this result, the Ghanaians placed bottom of their table with zero (0) point, not scoring a single goal in the competition and conceding 13 goals from their three matches. It should be put on record that, they were declared losers in their opening match against USA, when they failed to appear at the tournament venue due to visa problems and consequently lost three points and three goals to their opponents. In their second game, they were humiliated by Italy, when they lost 8-0. Officials and players of the Ghana National Deaf soccer team, Black Wonders, were neglected and abandoned in Melbourne, Australia. The team faced expulsion from the hotel and possible prosecution of their officials for non-payment of their bills.

On 15<sup>th</sup> January, Ghana web reported the standing of the Ghana National Deaf soccer team, Black Wonders, in Melbourne, Australia. The Black Wonders participated in the International Deaflympics hosted by Australia. The group became stranded because of its inability to pay for its hotel bills, which amounted to nearly \$27,000. Investigations established that the group's plight was not as a result of any direct negligence on the part of the Government of Ghana. This unfortunate situation arose through failure of

leadership at Ghana's Disabled Sport Association (GDSA) to do proper organization (Ghana News Agency, Saturday, Jan. 8, 2005).

Instead of seeking for funding for the group's participation in the Deaflympics from the government, including sponsorship from reputable companies, the GDSA, sought sponsorship for the event from visa racketeer. Under the arrangement with the GDSA, the visa racketeer(s) expected to obtain up to 160 visas from the Australian authorities, including the Black Wonders and their officials, who numbered 24, the proceeds from the sale of up to 136 visas was expected to generate substantial income, which would have enabled the racketeer(s) to fully fund the group's participation in the Deaflympics including paying for hotel costs, airfares and per diem. The arrangement with the racketeer(s) fell apart when the Australian Government approved only 24 visas. The Clarion Suitor's Gateway Hotel, where the Black Wonders stayed, confirmed that the initial reservation was for 160 rooms. However, this was reduced to 24 a few days prior to the start of the Deaflympics. The reason given to the hotel for cancelling the booking for other rooms was „visa problems“ (Ghana News Agency, Saturday, Jan. 8, 2005).

The application for 160 visas was not successful, because the Australian authorities became aware of the racket, having previously become a victim to the racketeers during the last visit to Australia by Azumah Nelson for an international boxing tournament. The racketeers successfully obtained and sold several visas to Ghanaians looking for the opportunity to travel and live abroad. After the boxing tournament, several of them absconded, which created a major diplomatic incident (Ghana News Agency, Saturday, Jan. 8, 2005).



The saga with the Black Wonders was very unfortunate, because it created a very stressful situation for their officials, many of whom were first time travellers to overseas. The group's plight was ameliorated considerably by the hotel's manager, who under extreme pressure from his management to expel the contingent, resisted and showed unparalleled compassion towards the Black Wonders and their officials. The timely intervention and absolute co-operation from Mr. Joe Aggrey, the then Ghana's Deputy Minister for Sports, contributed to the successful resolution of the matter. Mr. Aggrey's leadership in this matter was exemplary. His sympathetic approach to the plight of the Black Wonders led to the speedy transfer of funds from Ghana to settle the hotel bills. In addition, he had ensured that all entitlements due to individual members of the contingent were fully paid (Ghana News Agency, Saturday, Jan. 8, 2005).

The role played by the Bank of Ghana in this saga left a lot to be desired. In the age of electronic banking, it was unbelievable that an institution with prudential oversight responsibilities for the banking industry in Ghana could not transfer \$27,000 from Ghana to Australia electronically. According to the Ghanaian Sports Council Authorities, the bank of Ghana insisted that it would take up to one week to transfer the funds to the contingent in Australia. If this was true, it was a very serious indictment on the country, in particular its ability to attract international investors. How could Ghana benefit from overseas investment, when the National Bank could not even undertake simple electronic funds transfer, which was then almost a routine everywhere in the world? In contrast, a private sector bank, Prudential Bank Limited, was to transfer the funds without problems, and the hotel was able to confirm that the funds had indeed been transferred into its account, all within 24 hours (Ghana News Agency, Saturday, Jan.8, 2005). The



government of Ghana was to seek an explanation from the Governor of the Bank of Ghana for this failure in leadership, which had damaged the country's reputation.

The failure of the department of foreign affairs to inform the embassy in Japan, which had diplomatic and consular responsibilities for Australia, about the group's travel, needed investigation by the government. It was understood that, except for travel by ministers, the ministry did not routinely inform Ghanaian missions overseas about other official visits. If this was true, it was a very dangerous practice. How could Ghana provide adequate consular services to government officials overseas, either in situation like the incident in Melbourne, or in the event of a natural disaster such as the recent Tsunami in South-east Asia, if the mission were not aware of their presence in the countries where they represented Ghana's interest? (Ghana News Agency, Saturday Jan. 8, 2005).

The whole unfortunate incident had since then been settled satisfactorily, thanks to the efforts of several individuals in Ghana and Australia. It is important that the government of Ghana and all its agencies learn from this debacle. As a country, we can only progress if we learn from our mistakes. Learning from our mistakes also involves holding accountable people in leadership positions, who fail to deliver the expected outcomes in the public interest (Ghana News Agency, Saturday Jan. 8, 2005).

Meanwhile, the Ghanaian media highlighted the sponsorship package. It was reported in Accra, July 13, 2004, by the Ghana news agency that the Ghana deaf sports federation (GDSF) had appealed to individuals, philanthropists and organizations to come to their aid towards the organization of its sports festival and participation in international competitions. An appeal letter signed by Mr. Jonathan Amoah, president of GDSF,

copied to the Ghana news agency sports, stated that the national deaf soccer team wished to be known as the “black wonders” and was meant on beating its counterparts from South Africa to qualify for the World Deaflympics Games in Australia.

Mr. Amoah said that the federation was to organize the sixth national deaf sports festival between 16<sup>th</sup> to 19<sup>th</sup> September, 2006, at Sunyani to provide the deaf and people without hearing impairment the opportunity to compete with their peers as well as other sportsmen and women. The participants were to participate in soccer, volleyball, basketball, badminton, table tennis, tennis and athletics. He further reiterated that the federation had in its own small way been able to organize the first, second, third and fourth annual National Deaf Festivals at Takoradi in 1979, Kumasi in 1980, Cape Coast in 1981, and Tarkwa in 1984, but due to financial constraint they had been unable to continue the programme. They had therefore, appealed to organizations and companies to assist the federation to achieve its programme of reaching out to its members. The statement was that the aim of the GDSF was to create awareness through sporting activities, seeking and promoting the welfare of deaf sports members and providing all round athletics and sporting activities in the regions and at the district level (Ghana News Agency, July 13, 2004).

As a result of the appeal made for sponsorship, the National Deaf Soccer Team, the Black Wonders, secured a mouth-watering sponsorship package for their participation in the 20<sup>th</sup> Deaflympics Games which took place in Melbourne, Australia in 2005 (Ghana News Agency, November 11, 2004). Salvation Merchants Limited, a trade investments and event promotion firm, announced a sponsorship package of about one billion cedi for the team. The package included airfares, accommodation, feeding and internal transport

for the entire contingent during the Games. Mr. Yaw Owusu, Managing Director of the company, who announced the splendid performance of the team during their qualifying games against Nigeria and South Africa said that “such a feat was unprecedented and stupendous that it needed to be complimented with all the efforts, zeal and tenancy it deserved” (Ghana News Agency, November 11, 2004). According to the managing director, the offer created the necessary impetus and gave the players enviable exposure and the opportunity for them to give off their best. Mr. Owusu was of the view that when the less fortunate and disadvantaged in society were given the needed support, they would be able to attain greater heights, hence the need for other corporate organizations to join in the crusade.

The 20<sup>th</sup> Deaflympics summer games were the best ever world-class type event, organizationally, in the 81 year-old Game’s history. However, there was a major issue that affected these Games as well as the future of the CISS movement. The national delegations that participated in the Games did so illegitimately and in complete blatant violation of the CISS legal system’s rules. The three countries were Brazil, Ghana and the USA. By pulling out of five different teams, (women’s football, women’s beach volleyball, men’s handball, men’s and women’s volleyball) from the 2005 Games’ participation, Brazil was obliged to pay the withdrawal fee of \$25,000.00 to the CISS treasury. Brazil failed to pay before the Games; therefore, the Brazilians were in violation of rule 8.2 of the CISS constitution and 9.G of the Deaflympics Games Regulations (Ghana News Agency, January 11, 2005).

Furthermore, the still-anarchically-administered organization of CISS allowed Brazil’s two athletes to march in the Opening Ceremonies of the Games. These two

athletes were a part of Brazil's only entry in men's beach volleyball at the Games. Ghana originally planned to send to the Games its 124 member delegation, but just before the Games started, it informed the 2005 Games Organizing Committee that they would put off their appearance at this quadrennial Worldwide Sports event for the deaf people.

Strangely, on January 6, 2005, that is, a day after the January 5-superbly-organized Opening Ceremony festivities, nine football players from Ghana showed up at the Melbourne International Airport, then, these nine players instantly made "a feat" (Ghana News Agency, January 11, 2005). According to the GNA, all the players fatigued from a long air flight, went directly out from the airport to the local football field to face a game against Italy. The Ghanaians, by showing up with just nine players out of the required 11 on the field were easily crushed by the Italians, in the 2005 Games Championships, by a score of 8 goals to 0. Thus, the problem with Ghana was twofold:

1. For withdrawal of its three teams (women's and men's volleyball and men's basketball) from the 2005 Games earlier. Ghana was first supposed to pay to CISS the required \$15,000.00 team withdrawal penalty fee. This was on the basis of the rules 8-2 of the CISS constitution and 9.G of the Deaflympic Games Regulations, and
2. By having just nine players on its starting roster in the game against the mighty Italian team, the CISS handled this Ghanaian matter ineptly and humanely. Thus, the expulsion of the teams from Brazil and Ghana was based on strict observance of the CISS constitution rule 8.2 and Deaflympic Games Regulation rule 9. G.

The United States of America was considered as the number one abuser of the CISS legal system. The presence of their delegation at the games was highly

questionable. In retrospect, at the last Summer Games in 2001, held in Rome, Italy, and the Winter Games held in 2003 in Sundsvall, Sweden, the USA illegally collected 70 and 15 medals (including an aggregate of 27 gold) at the two Games, respectively. In addition, many countries that were competing at the games, such as Germany, Sweden, Ireland and others, dutifully and responsibly paid off their penalty fees to the CISS for their previous violation of CISS rules, including their teams' withdrawals, on or before the start of the 2005 CISS Congress and Games. What was to be done in order to restore the long-awaited law and order in the organization of the CISS and its whole Deaflympic movement? And how could the CISS leadership justify its own "Equal through Sport" in the eyes of the whole world?

The national Sports Festival for the people with hearing-impairment has been in existence since and the 2005 edition opened at the Wa Secondary School. Twelve schools for the deaf across the country participated in the five-day festival, which involved athletics, soccer and volleyball. The schools were Jamasi, Bechem, Cape Coast, Koforidua, Adjei Kojo, Savalugu, Gbeogo, Hohoe, Sekondi, Wa, Kibi and Mampong Akwapim (Ghana News Agency, April 27, 2005). The major aim was to get athletes with hearing-impairment from Ghana to get the exposure that would put them at the world class level.

Mr. Yaw Osafo-Mafo, the then Minister of Education, Science and Sports, in a speech read for him, advised the physically challenged not to see their condition as a barrier to the realization of their potentials in life. He said the nation owed it a duty to the physically challenged to provide them with opportunities and facilities that would help them develop into fully integrated members of the society. He recalled the exploits of the

country's physically challenged athletes who won a number of medals during the "All Africa Games" at Abuja in Nigeria, in 2003, and said with determination they could achieve a lot for themselves and the country (Ghana News Agency, April 27, 2005).

Looking at how those with hearing-impairment have succeeded in sports play in the world over, it is envisaged that if good exposure is given to the children with hearing-impairment in Cape Coast School for the Deaf and for that matter Ghana as a whole, they could develop to a world class standard in sports performance.

## **2.9 Motor-Skill Related Physical Fitness Components**

The motor skill-related components include; ability, balance, coordination, power, speed and reaction time. According to Colfer (2004), while physical fitness and a healthy lifestyle are desirable, many people also participate in a variety of competitive sports or mission-related competition. Success in games and contests require more than just being fit. It demands motor skill-related physical fitness components to enable one to move and perform more efficiently, whether it is in work-related activities, daily movement functions, or in sports performance. Further, health-related physical fitness may also benefit from skill-related physical fitness, since persons who possess skill-related fitness are more likely to be active throughout life.

Motor skill-related physical fitness is compatible with health-related physical fitness. Many activities promote both types. Individuals, who possess both, will find participation in either type of activities more enjoyable and beneficial to their health and physical well-being. A person who is physically active cannot help but improve some aspects of skill-related physical fitness.

### **2.9.1 Agility**

This is defined as the ability to rapidly and accurately change the direction of movement of the entire body mass in space (Corbin, et al, 2000). Agility also means a quick and efficient upward and downward motion in ballet, modern dancing and some folk dancing. According to Prentice (1999), agility is to a large extent dependent on neuromuscular co-ordination and reaction time. In such sports like basketball, badminton, handball and tennis, the ability to stop and start, and to change direction, is nearly a prerequisite to success. Also, people who are agile are less accident prone, because of their ability to make quick adjustments in body movements. The motor ability of agility is difficult to develop. However, it can be improved through participation in activities which develop strength, coordination and speed. If strength is increased, agility will increase in movements involving heavy resistance, such as rapid stopping and starting, or in movements involving the force of inertia which keeps the body in motion in the same direction.

Developing speed and agility in sport is specific to the game or sport an athlete plays. In team or court-based sports, it differs from the technique of a sprinter, in that the track athlete can run flat-out, with maximum stride length and stride rate in a straight line. For example, the speed and agility requirements in a court-based sport are very different to those of a field-based team sport. In badminton, because of the very small court, an athlete will take a maximum of one or two steps in a particular direction to cover the court, involving a high frequency of diagonal, lateral, forward and backward movements. A netball, hockey, or rugby player, on the other hand, would rarely travel



more than thirty metres, so the most important qualities are very different. Acceleration and the ability to change direction rapidly is the key in team sports.

To improve speed and agility, strength and conditioning coaches would include specific workouts targeting that physical quality into the weekly programme of an elite team sport athlete, in addition to the endurance or strength training they were practicing, to produce an enhancement in performance or strength training they were doing. To produce an enhancement in performance at elite level, the player or sports specific needs are carefully considered, before drills which develop the skills are designed, mostly concentrating on acceleration and change of direction (Dick, 1992).

In rugby or hockey, a player would accelerate into position, either to find space or to make a challenge, but those movements are often angled runs, changes of direction whilst running or running in a curve. So, any exercises or drills designed to improve that ability, would necessarily be sports-specific (Dick, 1992). According to strength and conditioning coach, Raph Brandon, “improving speed and agility” is more of a skill than physiological ability, such as strength. Most training sessions involve very specific, high-quality sessions, with plenty of rest, rather than lots of repetitions (Dick, 1992). It is difficult to define one set of agility exercise, although there are certain general exercises that are useful for developing footwork skills, agility ladders, side-stepping, basic cross over forwards and backwards, and shuttle runs, which can be useful for a number of sports (Lieberman, 1999). We can improve our agility by improving the component parts of agility and practicing the movements in training. One of the ways to improve agility is by the agility ladder. In various fields of sports competition, the body is constantly asked to perform movements from unfamiliar joint angles. The main objective for agility ladder



programme is to promote a wide range of different foot and movement patterns. These skilled movements, become second nature, and the body is able to quickly respond to various angles that are required in sporting events. We can improve our agility by practicing the movements in training, and an agility ladder is an essential tool in a complete agility programme. Using a standard ladder of 10 yards long with 18 inches squares, 2 to 4 movement patterns are introduced. Once you master these patterns, introduce new patterns. Keep in mind that this is a general recommendation, as the introduction of movements depends on the athlete's ability to master the movements.

There are number of tests to measure athlete's agility. They include:

- Hexagonal obstacle agility test
- Illinois run agility test.
- Lateral change of direction test.
- Quick feet test
- "T" drill test.

### **2.9.2 Balance**

The complex quality called balance involves reflexes, the inner ear, the cerebellum, and the skeletal-muscular system which forms a specific kind of coordination. Balance is defined to be the ability to maintain some degree of equilibrium while moving or standing still (Prentice, 1994). According to Auxter et al., (1997) balance is the ability to maintain equilibrium in a held position (static) or in moving position (dynamic). The ability to maintain the equilibrium of the body manifests itself in two types, static balance, and dynamic balance. Static balance involves the maintenance

of equilibrium in a fixed position such as while standing on one foot on a narrow stick for a period of time. Dynamic balance on the other hand is when the equilibrium must be maintained while moving. Walking on a balanced beam is an example of dynamic balance.

According to Sherrill (1993), balance is a more global term, referring to the control processes that maintain body parts in the specific alignments necessary to achieve different kinds of mobility and stability. Most sensory systems (vestibular, kinaesthetic, tactile, and visual), interact with environmental variables to bring about balance. According to Auxter et al., (1997) until balance becomes an automatic, involuntary act, the central nervous system must focus on maintaining balance to the detriment of all other motor and cognitive functions. Balance development is dependent on vestibular, visual reflex, and kinaesthetic development. When these systems are fully functioning, high levels of balance development are possible. Gymnastic events, such as floor exercise routines, and balance beam performance require good balance. Diving and some forms of dancing also require unusual amounts of balance. Stability is especially important in contact sports such as wrestling, American football, rugby and soccer, but can also be found in lifetime activities like skiing, skating, bowling, golf and tennis. The basic factors which influence balance are the height of the centre of gravity, the size of the base of support and the line of gravity.

But the principles which aid balance include:

1. The lower the base, the greater the balance and stability
2. The larger the base of support, the greater the balance and stability

3. The more nearly centred the line of gravity is to the centre of the base of support, the greater the stability.

Activities that can be used to promote static balance include:

1. Freeze tag – the children play tag, the child who is caught is “frozen” until a classmate “unfreezes” the child by tagging him or her. “It tries to freeze everyone”.
2. Statue – the child spins around and then tries to make himself/herself into a “statue” without falling.
3. Tripod – the child balances by placing forehead and both hands on the floor, kneels and balances on elbows to form tripod balance.

Activities that can be used to promote dynamic balance include:

1. Hopscotch
2. Various types of locomotor movements following patterns on the floor
3. Races using different types of locomotor movement
4. Walk forward heel to toe between double lines, on single line, and then on balance beam, make this more demanding by having child balance a bean bag on different body parts (e.g. head, shoulder, wrist, etc) while walking on the balance beam.

Cues to poor balance developments include:

1. Inability to maintain held balance position, e.g. standing on one foot, stand heel to toe with eyes open
2. Inability to walk heel to toe on a line or on a balance beam
3. Tipping or falling easily.

4. Wide gait while walking or running (Auxter et al., 1997).

According to Sherrill (1993), input from both semicircular canals and the sacs are needed in all kinds of balance. This is because the head moves in many ways during both static and dynamic balances. The principle of specificity tells us that there are many kinds of static and dynamic balances, and a test of balance in one position will not yield data that are generalized to other positions. The maintenance of balance involves both sensory input and motor output. Many motor impulses are generated to control balance. Some go directly to muscles that activate reflexes and or reactions, some go to the cerebellum, and some go to midbrain nuclei of cranial nerves that innervate the eye muscles.

Balance in young children is heavily influenced by vision, whereas adults rely more on tactile and kinaesthetic input (Sherrill, 1993). This explains why children and persons with developmental delays are encouraged to focus their eyes on a designated point during balance activities. It also explains why blindfolds are often used in testing and remediation of balance.

The vestibular system is well developed at birth, as is evidenced by the calming effect of cradling or rocking the infant in the arms, crib, or rocking chair. Swings, seesaws, merry-go-rounds, and other playground apparatus owe their popularity to children's natural craving for vestibular stimulation. The use of balance boards, various kinds of balance beams, swinging bridges and trampolines in early childhood physical education is based largely on the theory that postulates that the vestibular system is a coordinating mechanism for all sensory function that leads to balance (Sherrill, 1993).

### 2.9.3 Coordination

This can simply be defined as the ability to use the senses with the body parts to perform tasks smoothly and accurately (Corbin, et al, 2000). It can also be defined in other words as the ability to integrate the senses, visual, auditory and proprioceptive, with motor functions to produce smooth, accurate and skilled movement (Prentice, 1999).

Most bodily motions, even simply holding out a hand involve the precise, accurate movements of dozens of muscles. In order for the body to move uninhibited, there must be a smooth synchronization of muscles. According to Auxter et al., (1997) differential relaxation or controlled tension attributable to the reciprocal action of agonist and antagonist muscles provides for coordination movement without undue fatigue. The nerve signals are processed by the small, rear, wrinkled part of the brain, called the cerebellum, before they pass out to the muscles. This ensures the resulting action to be smooth and coordinated. Generally, coordination refers to the human ability to perform simple and complex movements. Speed, precision, rhythm, fluency and economy of execution of the different motions are very important elements of the evaluation of coordination. Coordination takes on different forms and levels depending on these elements. From the sport-specific requirements we can observe three distinctive types of coordination based on the way each movement must be performed to be successful:

1. Precisely executed simple and complex movements
2. Precisely executed motions which are performed as fast as possible or in a timely fashion

3. Precisely executed simple and complex skills which are performed as fast as possible, or in a timely fashion in a continuously changing environment, or in the presence of an opponent.

In the first case, there is coordination where the tasks are very precise and the speed of execution is not important. The ranges of the movements are from quite simple, done by one group of muscles, to complex, full body motions. This type of coordination can be quite easily measured by its precision or deviation from the model. Golf, shooting and polo are based on coordination of precise movements which include alignment of the body in relation to the target and can be measured by angles. In simple terms, this type of coordination involves the ability to move the whole body or parts of it to a very precise position or angle, in some cases without the opportunity to use visual control. Sports like gymnastics and figure skating are examples where the evaluation of coordination is an ability to reproduce exercises or complex sequences of movements as close as possible to perfect model of that motion. There are individuals who can reproduce even the most complex motion with high precision as long as there is no time restriction. However, when the skill has to be performed as fast as possible or with required speed to be effective, they cannot do it. This type of coordination is very important for throwing events like shot put and javelin, jumping events like high and long jump. It is also good for weight lifting and diving. In this case, the ability to finish each segment of the motion will have direct impact on final result. A diver's inability to execute air acrobatics on time, in order to assume the proper entry position, will cause a big splash and major points deduction. In throws or jumps, precise skill performance in a timely manner will decide about length or height achieved. In young athletes, this type of coordination can be

evaluated by the time of execution of combined movements in an obstacle course which might include running, jumping over barriers, and doing simple acrobatics such as summersaults. This coordination is also important in training soldiers, where routines have to be executed as fast as possible or in a timely fashion (Jamie, 2005).

The last type of coordination is needed for all team sports, fighting sports like wrestling, judo or boxing, tennis etc. In this case, precise movements have to be, not only fast and timely, but also adjusted to changing situations during the contest. Soccer, hockey or basketball player receiving a ball or puck during a game must quickly choose, depending on the situation and position on the field, what to do, how to do it and how this will affect the play. There are a lot of players, who, during training or staged plays, can precisely kick, pass, dribble, run with the ball and execute tactical elements. However, during game situations, with changing environments, they have trouble using their skills. This is usually due to their inability to adapt and modify them to ever changing situations. Most coaches assume that the athlete is “choking” in the game situation, when in fact, the problem is most likely due to lack of proper coordination. Measuring this type of coordination is quite difficult. Observation of actual performance is probably the best source of information. During training, reaction of an athlete to the introduction of surprise may be a good indicator of what can happen in an actual game (Jamie, 2005).

A well developed sense of motion is important to good coordination. This sense, in cooperation with vision and sound, allows the athlete to get information from the muscles, as well as the body's spatial position and dynamics of movement (e.g. speed). Athletes with a well developed sense of motion can make corrections during the execution of movements and are able to imagine and visualize each element of very

complex activities. Coordination is influenced by the genetic makeup of the individual, as well as the individual's imagination, acquired skills and experience. During human development, coordination improves along with the state of nervous system. Kids learn simple motions early on and later build complex responses which can be performed precisely fast and in different situations. Coordination consists of many elements which would not be categorized here. However, it is important for coaches and parents to know basic elements so they can evaluate the development of coordination in kids and use them for teaching, observing or testing purposes. Some of the basic elements are:

- Balance, both static and in motion (standing, running), or with use of equipment (e.g. cycling, skiing, skating and balance beam)
- Speed of reaction from movement of parts of the body to reaction in motion like starting, turning, stopping, and accelerating
- Spatial orientation which is awareness of changing environment in relation to your own movements or position
- Ability to differentiate between movements by feeling, like applying the right amount of required pressure or tension and speed
- Jumping ability
- Precision, fluency and control of rhythm
- Concentration and perception of time and distance

Very often, the evaluation of coordination may involve more complex abilities where additional exercises are built on simple coordination (e.g. rotating the body in the air) (Lieberman, 1999). Coordination, like all others ability, can be general and specific, related to precise skill movements. There is no doubt that a high level of general



coordination makes it easier to learn specific coordination. The term coordination is also applied to complex physical actions controlled by the brain and the nervous system, such as catching ball, playing piano, or riding on roller skates. The body's sensory systems such as sight, touch and balance and its muscular system all work together to make the movements smooth and skilful. Various parts of the body may be involved such as eye-foot coordination, hand-eye coordination, kicking and catching a ball. The breaststroke in swimming can help in demonstrating what is meant by coordination in that a person can learn the arm stroke and the kick separately. However, a maximum performance will rest only if these parts that were separately learnt are combined in a smooth flow of movement (Lieberman, 1999).

Sequence in a skill is another example of coordination. When two forces are added sequentially, the exact time that the second force is initiated is crucial to performance. If it is started too soon, or too late, performance decreases. A javelin thrower, for example, must be able to sequentially perform each segment of the motor task of javelin throwing at the correct time or the performance will be minimized. The cross over step for instance must occur at the appropriate time to the release for a coordinated effort. However, there is no such a relation in opposite direction, so, if somebody acquires perfect swimming technique, without developing general coordination, the one will still have a harder time learning skiing, games, gymnastics and other sports than an athlete with well developed general coordination (assuming that the one's genetic heritage is not far apart) (Lieberman, 1999).

Most sports techniques are complex movements which athletes learn based on previously established simple skills and coordination. An athlete with a high level of

general coordination and many skills will learn new technique faster, by “assembling” smaller elements together. As well, in sports, where technique has to be executed in the presence of an opponent and in a changing environment, the athlete’s technique will be more versatile and universal. Let’s take a soccer player who, in childhood, reached a high level of general coordination and mastered basic skills like elements of gymnastics, acrobatics, balance, jumping agility, tactical and technical knowledge of other games, basic skills from track and field like sprinting, jumping, throwing, and compare him to somebody who spent this time playing soccer. Who do you think will learn technical and tactical aspects of the game quicker and more effectively? Who will be more creative in changing situation? Who will be able to react faster, turn quicker, and throw farther, kick with different parts of the leg, hit with the head in all directions and with a variety of speeds? Athletes with great general coordination, regardless of age, learn new techniques and correct mistakes faster and better than those who only focus on specific coordination. Really, the only way to improve coordination is by learning new skills and performing those already known in continuously changing environment (Lieberman, 1999).

In learning coordination, the first step is for the athlete to master motions in a stable environment, without time restrictions, focusing on improvement of precision. After the skill becomes formed, they can move to learning to do it fast while maintaining correct form and adapting to different situations and environments. In the annual cycle, in early stages of accumulation (early stage of preparatory period), even highly advanced athletes should try to acquire new skills, before focusing on specialized movements (Lieberman, 1999). Coordination may be measured by the number of successful alternate

hand tosses in a specified period of time or by tossing a tennis ball very high and catching it. Kicking a moving ball requires coordination as well (Corbin et al., 2000).

#### **2.9.4 Power**

Most experts classify power as skill-related component of fitness, because it is partially dependent on speed. On the other hand, power is also dependent on strength and can be classified as a health-related component as far as strength is involved (Corbin, et al., 2000). Thus, power falls somewhere in-between the two distinct groups of fitness attributes. Power is, therefore, defined as the ability to contract the muscles with the speed and force in one explosive act (Beashel et al., 2001). In other words, power is the ability to transfer energy into force at a very fast rate (Corbin, et al, 2000). Power can also be defined as the rate at which energy is expended or work is done (Beashel and Taylor, 1996).

The use of power is not limited to sport and dance activities only. We use power extensively in our daily activities every time we apply force to move something quickly. The demonstration of power and strength is typical in events like long jump, putting the shot, throwing the discus and hitting a baseball for a distance. Muscles are used to apply force at a rapid rate to give the body or the object the necessary momentum to carry it to the desired distance. In a formula form,  $\text{power} = \text{force} \times \text{velocity}$ . Power is certainly necessary for a performer to survive or excel in athletics and even to enjoy successful participation in recreational games such as tennis, handball and golf. Many occupations even require power in some form for their tasks. The energy for our muscular power is from the anaerobic system (Beashel et al., 2001). Whenever you look in the world of

top-class sport, power counts, and one of the best ways of developing this most precious commodity is through plyometric training.

Plyometric exercise is based on the understanding that a concentric (shortening) muscular contraction is much stronger when it immediately follows an eccentric (lengthening) contraction of the same muscle. It is like stretching out a coiled spring to its fullest extent and then letting it go. Immense levels of energy are released in a split second as the spring recoils. Plyometric exercises develop this recoil or, more technically, the stretch/reflex capacity in a muscle. With regular exposure to this training stimulates, muscle fibre should be able to store more elastic energy and transfer more quickly and powerfully from the eccentric phase. However, to get the best out of plyometrics, you need adequate pre-conditioning. And that's where weight training can play a crucial role. Moreover, when it comes to selecting the right plyometric moves, the coach or athlete needs to consider the specifics of the sport, the athlete's maturity, his level of pre-conditioning and his ability to pick up what can be a complex skill. Power can easily be measured by vertical jumps or standing broad jumps for power in the legs and throwing a medicine ball for a distance which will test for power in the arms (Lieberman 1999).

### **2.9.5 Speed**

Speed is defined as the production of repeated maximal muscular contractions over a short distance within minimal period of time (Beashel & Taylor, 1996). According to Prentice (1994) speed is the ability to perform a particular movement very rapidly. It is a function of distance and time. It is an important component for successful performance in many competitive athletic situations. Speed can also be defined as the ability to

perform a movement in a short period of time (Corbin, et al, 2000). Speed can be improved by practice. For example, speed in running can be increased if one should learn to run in the proper manner. Thus, the big toe of one leg should be as close to the shin of the other leg as possible. The foot should recover this position as quickly as possible, recover in that position so that it makes the leg a shorter lever, and in the downswing stay dorsiflexed. Every time an athlete hits the ground the first part of contact involves losing momentum. This can be minimized by maintaining dorsiflexion and having a fast moving backward (active) foot. Obviously, movement time is decreased if one stands too straight or too far forward when running for speed (Beashel & Taylor, 1996). According to Dick (1992), speed in training theory is defined as the capacity of moving a limb or part of the body's lever system or whole body with the greatest possible velocity. Maximum value of such movements would be without loading. Thus, the discus throwers' arm will have greatest velocity in the throwing phase if no discus is held, and velocity would be reduced as the implement's weight is increased relative to the athlete's absolute strength (Dick, 1992).

Speed is measured in metres per second, for example, in quantifying the value for speed of moving one part of the body's lever system relative to another, the forward speed of the body in sprinting or a point of take-off in jumping, and the velocity of implements and balls at release or being struck. The time taken to achieve a certain task may also be considered a measure of the athlete's speed. The number of repetitions of a task within a short period of time might be considered an index of speed (Dick, 1992).

According to Dick (1992), speed is a determining factor in explosive sports, for example, sprints, jumps and most field sports, while in the endurance events its role as a

determining factor appears to reduce with increased distance. As with the characteristic or strength, relative contribution of speed to each sport varies according to the demands of the sport, the bio-type of the athlete and the specific techniques practiced by the athlete. Consequently, the distribution of speed training units and the nature and number of practice are extremely varied.

Speed may be a determining factor directly, for example, reacting to the starter's pistol, or indirectly, in the development of kinetic energy in jumping. The difference between direct and indirect is that, with the former, maximum velocity is sought, whereas with the latter some optimum velocity is required to permit maximum expression of relevant strength. It is therefore, important to bear in mind that speed increases may not necessarily lead to improved performance. The pattern of speed and acceleration of relative movements must be synchronized so that each part of the lever system can make an optimal force contribution. For example, there would be no point in making the discus arm so fast that it did not begin its contribution before the legs and trunk, nor would it benefit the long jumper to have so much horizontal speed at the board that there was insufficient time for the take-off leg to express the strength required for vertical lift (Dick, 1992).

Speed is also the quickness of movement of a limb, whether this is the leg of a runner or the arm of the shot putter. Speed is an integral part of every sport, and can be expressed as any one of, or combination of, the following six areas in sports performance where training enhances speed:

- Reaction to a signal as, for example, in the sprinter's reaction to the gun, or the tennis player's reaction in volleying.

- Capacity to accelerate, this is of particular importance to those athletes who must beat opponents across the ground or who must quickly react at a particular point on the court/pitch to execute a technique.
- Capacity to rapidly adjust balance following the execution of one technique in order to prepare to execute another. This applies to every game situation.
- Achievement of maximum speed, the athlete here is executing a given technique as fast as he/she is capable of, without breakdown of that technique's effectiveness. Often speed is mistakenly thought of as an entity in itself, it is not. It is a sophistication of technique, where all demands of the technique are performed at the highest speed consistent with the general synchronized framework.
- Capacity to maintain maximum speed once it is reached. This, also, is a coordination issue, not an endurance issue, and is seen, for example, in sports where athletes such as Ben Johnson and Carl Lewis can maintain their maximum speed of 12.05m/sec for only 2m. This is not followed, as one might expect, by a gradual loss of speed for the balance of the race. Rather there is breakdown of coordination for 10m before returning to the point from which gradual deceleration will commence.
- Capacity to limit the effect of endurance factors on speed, the rate at which fuel reaches the working muscles, and waste products are removed, eventually represents a limiting factor to producing the high intensity muscle contraction and quality coordination necessary to maintaining or near maximum speed (Dick, 1992).



- Speed is influenced by the athlete's mobility, special strength, strength endurance and technique. According to Dick (1992), the development of speed is dependent on several factors.

Innervations, high frequency of alternation between stimulation and inhibition of neurons, and an accurate selection and regulation of motor units, makes it possible to achieve a high frequency of movement and/or speed of movement, married to an optimal expression of deployment of strength. This is the fundamental ability to move limbs at maximum velocity.

Elastic, the capacity to capitalize on muscle tone via the elastic component of muscle has relevance to those sports demanding high starting acceleration (as in sprints and most field sports) or „rapid strike“ (as in sprinting and jumping). The precise mechanisms involved are not clear but there appears to be a complex coordination of motor units, reflexes, elastic components and the ability to contract muscle at high speed. The characteristic is, however, identifiable and has been referred to in sports jargon as „bounce“. Elasticity is related to relative strength and elastic strength.

Biochemistry, speed would appear to rely specifically on the energy supplies in muscle, i.e. a lactic anaerobic pathway (energy pathway), and on the speed of its mobilization. Short duration maximum intensity work appears to be the training stimulus for development of this. Muscle relax-ability, the ability of the muscle to relax and to allow stretch in speed exercises is fundamental to perfect technique and to a high frequency of movement. If these qualities are insufficiently developed, the required range of movement cannot be achieved in the course of the movement, particularly in the course of reversal of movement where the synergists have to overcome too great a



resistance. Training which obliges the athlete to relax all muscles not directly involved with a given series of joint actions, even in fatigue, is of the utmost importance.

Willpower, the athlete must concentrate on maximum voluntary effort to achieve maximum speed. However, unlike the weight lifter who has a target for his concentration, the athlete has nothing more to go on than physical sensation and the evidence to a stop watch. Human error may occur with the latter, so the coach must ensure that all possible information on speed and time is given to the athlete. Moreover, to provide a suitable target, speed work may be performed in groups, using handicaps and races.

Action acceptor, many situations, especially in combat sports and field games, demand rapid selection of relevant cues, and the technical ability to do so accurately will influence speed of movement or reaction (Dick, 1992). Energy for absolute speed is supplied by the anaerobic lactic pathway. The anaerobic (without oxygen) lactic (without lactate) energy system is best challenged as an athlete approaches top speed between 30 and 60 metres while running at 95% to 100% of maximum. This speed component of anaerobic metabolism lasts for approximately six seconds and should be trained when no muscle fatigue is present (usually after 24 to 36 hours of rest) (Dick, 1992).

The technique of sprinting must be rehearsed at slow speeds and then transferred to runs at maximum speed. The stimulation, excitation and correct firing order of the motor units, composed of a motor nerve (neuron) and the group of muscles that it supplies, makes it possible for high frequency movements to occur. The whole process is not totally clear but the complex coordination and timing of the motor units and muscles most certainly must be rehearsed at high speeds to implant the correct patterns (Prentice, 1994).

Flexibility and correct warm up will affect stride length and frequency. Stride length can be improved by developing muscular strength, power, strength endurance and running technique. The development of speed is highly specific and to achieve it, we should ensure that:

- i. Flexibility is developed and maintained all year round.
- ii. Strength and speed are developed in parallel.
- iii. Skill development (technique) is pre-learned, rehearsed and perfected before it is done at high speed level (Dick, 1992).

Speed training is performed by using high velocity for brief intervals, this will ultimately bring into play the correct neuromuscular pathways and energy sources used. It is important to note that the improvement of running speed is a complex process which is controlled by the brain and nervous system. In order for a runner to move more quickly, the leg muscles of course have to contract more quickly, but the brain and nervous system also have to learn and control these faster movements efficiently. If you maintain some form of speed training throughout the year, your muscles and nervous system do not lose the feel of moving fast and the brain will not have to re-learn the proper control patterns at a later date. In the training week, for example, speed work should be carried out after a period of rest or light training. In a training session, speed work should be conducted after the warm up and any other training should be a low intensity.

Speed development for track events has been extensively documented and will provide useful general knowledge of the practice of speed development for other sports. The intensity of training loads for speed development commences around 75%

maximum. Here, the athlete is learning at a relatively high intensity, those adjustments necessary to maintain the pace of rhythm of a technique, whilst “timing” is put under pressure. Gradually, the athlete moves towards 100% training load. However, progressing demands that the athlete attempts to surpass existing speed limits. Rehearsals of technique at intensities which break new grounds are clearly not possible great volume for reasons ranging from mental concentration through to energy production. It is for this reason that measures are taken to facilitate the learning process by training athletes at altitude, pulling the athlete on an elastic rope, reducing the weight of implements and so on (Beashel and Taylor, 1996).

Just as with strength training practices, the athlete must have mastery of technique before seeking to progress execution of technique at speed. The sequence of development is to:

- Develop a level of general conditioning which permits learning a sound basic technique.
- Learn a sound basic technique
- Develop a level of specific conditioning which permits progressive sophistication.

Technical components should be learned and stabilized at slower speeds. Nevertheless, from the outset the athlete should be encouraged to consolidated technique by accelerating the level of intensity. This is necessary because a transfer of technique learned at a slow speed to the demands of maximum is usually very complex. To this end, practices are used in sprinting where the athlete runs a distance about 75m, concentrates on the perfection of running action for 40m, and then raises the speed of running for 35m. Or gain, a technical component, such as those rehearsed in sprinting drills is worked for

25m and then an athlete gradually accelerates to near maximum intensity over the next 50m. A tennis player brings the speed of service down to that which allows him to play the ball accurately in the service court and to “feel” the synchronization of each element in the technique as a basis of development, then to progress pace, but within the constraints of sound technique.

Finally, the athlete masters that level of speed which permits him to select a given pace within his range that is sufficient to overcome the challenge of his opposition. No fatigue should be evident in speed training because it is essential for the nervous system to be in a state of optimal excitement. Consequently, speed training will follow immediately upon relevant warm-up (Dick, 1992). A relationship exists between intensity and extent of loading cannot be great. On the other hand, it is necessary for the athlete to rehearse a technique frequently at high intensity if new levels of speed are to be stabilized. The following are some of the useful guidelines to making decisions on extent:

1. Techniques can be repeated in high volume and high intensity only if presented in small „learning packages“, which ensure the highest speed of execution, and recovery periods, which permit athletes, timed to consolidated neuromuscular memory patterns. So a large number of sets with small numbers of repetitions of very high intensity would be most suitable.
2. In spring training, the minimum distance to develop acceleration is that which allows the athlete to achieve near maximum speed. For most athletes, this is around 30m-40m. However, in other sports there are constraints imposed by the confines of the playing area. In some sports, then, the athlete must learn to achieve maximum acceleration over a very short distance (5m-10m) and „arrive“

at the conclusion of such a burst of speed, prepared to select and execute a high precision technique. Soccer, tennis and basketball are examples of such sports.

3. Where maximum speed is being practiced, a limiting factor to effective rehearsal can be the exhausting process of accelerating to maximum speed. For example, in long jump, and in games where passing must be practiced at the highest speed, the athletes must lift their pace from being stationary to the pace required. This is very tiring. To overcome the problem, some athletes practice from longer rolling starts or with the assistance of downhill starts. This means that although the athlete would look for distances of 10m-30m to practice maximum speed itself, it may be necessary to have 40m-60m roll-in to reach that speed.
4. Optimal values can only be determined by individual testing on how long maximum speed can be held. The initial problem is of course, to achieve maximum speed. Coordination and concentration are the keys to extending this distance, but it is unlikely that it will reach 30m or further without the assistance offered by altitude.
5. In sprinting, most athletes require 5-6 seconds to achieve maximum speed. This suggests that distance of 50m-60m is required to develop the linking of initial acceleration and pick-up of maximum speed.

Recovery period between runs at maximum speed must be long enough to restore working capacity, but short enough to maintain excitement from the nervous system and optimal body temperature. Given a reasonable warm climate, the interval between each run should be between 4-6 minutes, which creates problems for athletes who train in

other climates. In the interest of gaining optimum advantage from each run, it might be advisable to allow this interval into warm-up before each run (Dick, 1992).

Sprinting speed can be developed in other ways:

1. Toeing- the athlete is towed behind a motorcycle at a speed of 0.1 to 0.3 seconds faster than the athlete's best for a rolling 30 metres. This pace is held for 20 metres to 30 metres following a gradual build up to maximum speed over 60 metres to 70 metres.
2. Elastic pull – two tabular elastic ropes are attached to the athlete. Two coaches positioned forward and to each side of the athlete, extend the elastic full stretch and the athlete is virtually catapulted over the first 10 metres from a standing or crouched start.
3. Downhill sprinting is safer alternative to developing sprinting speed. A hill with a maximum of a 15 degree decline is most suitable. Use 40 metres to 60 metres to build up to full speed and then maintain the speed for a further 30 metres. A session could comprise 2 to 3 sets of 3 to 6 repetitions. The difficulty with this method is to find a suitable hill with a safe surface.
4. Over-speed work could be carried out on the track when there are prevailing strong winds – run with the wind behind you.
5. Some simple reaction speed drills can be used to develop speed.
6. The athletes start in a variety of different positions – lying face down, lying on their backs, in a push up or sit up positions, kneeling or seated. The coach standing some 30 metres from the group then gives a signal for everyone to jump up and run towards him/her at slightly faster than race pace. Repeat using various

starting positions and with the coach standing in different places so that the athletes have to change directions quickly once they begin to run. Speed reaction drills can also be conducted whilst controlling an item (e.g. football, basketball, hockey ball) with an implement (e.g. feet, hand, hockey stick).

The general principles for improved speed are as follows:

- Choose a reasonable goal for your event, and then work on running at velocities, which are actually faster than your goal over short work intervals.
- Train at goal pace in order to enhance your neuromuscular coordination, confidence and stamina at your desired speed.
- At first, utilize long recoveries, but as you get fitter and faster shorten the recovery periods between work intervals to make your training more specific and realistic to racing. Also move on to longer work intervals, as you are able.
- Work on your aerobic capacity and lactate threshold, conduct some easy pace runs to burn calories and permit recovery from the speed sessions.
- Work on your mobility to develop a range of movement (range of motion at your hips will affect speed) and assist in the prevention of injury.

The following is a seven –step model for developing playing speed:

- Basic training to develop all qualities of movement to a level that will provide a solid base on which to build each successive step. This includes programmes to increase body control, strength, muscle endurance, and sustained effort (muscular and cardiovascular, aerobic and anaerobic).



- Functional strength and explosive movements against medium to heavy resistance. Maximum power is trained by working in an intensity range of 55% to 85% of your maximum intensity.
- Ballistics to develop high-speed sending and receiving movement's plyometrics to develop explosive hopping, jumping, bounding, hitting and kicking.
- Sprinting form and speed endurance to develop sprinting technique and improving the length of time you are able to maintain your speed.
- Sport loading to develop specific speed. The intensity is 85% to 100% of maximum speed.
- Over speed training. This involves systematic application of sporting speed that exceeds maximum speed by 5% to 10% through the use of various over speed training techniques.

The ability of an athlete to perform at speed is critical in sprint events as in running, cycling, rowing and swimming, as examples. In terms of time-scale, this includes events that last less than 35 seconds and involve the alactacid energy system (Beashel & Taylor, 1996). In most sports we generally notice the production of force at speed. Athletic field events such as the high jump, javelin, discus and shot put are good examples of the production of explosive force. Pace is a vital element in the longer sprints events. Terms such as maximal accelerations and endurance speed, have been used to describe the different types of speed that a sprinter may employ. Speed is essential for the good short stop in baseball, the football back, the fencer and the sprinter. Running distance for time is the most widely accepted measure for speed. However, the

distance must be sufficiently short so that cardio-respiratory endurance does not become a limiting factor.

All athletes want more speed, whether 100m sprinters or marathon runners. After all, is it more frustrating to lose a track event in the last two metres, or a marathon in the last two hundred metres? However, it is often assumed that those blessed with great speed or strength, are born with a higher percentage of fast-twitch muscle fibres, and that no amount of speed works (or neuronal stimulation) will turn a cart-horse into a race horse. But in fact, fast-twitch fibres are fairly evenly distributed between the muscles of sedentary people, with most possessing 45%-55% of both fast-and-slow-twitch varieties. It means that training can develop an athlete in speed. The 30 metres dash and the 50 metres sprint with flying start are mainly used to measure running speed (Dick, 1992).

### **2.9.6 Reaction Time**

This is simply defined as the time elapsed between stimulation and the beginning of reaction to that stimulation (Corbin, et al., 2000). It can also be defined as the amount of time between the presentation of an unanticipated stimulus and the start of a response (Beashel and Taylor, 1996). It is important to emphasize that reaction time does not include movement time. Reaction time can be said to be innate and is primarily affected by one's state of mental alertness. It adds up to the output especially in terms of running speed.

According to Kosinki (2005), reaction to sound is faster than reaction to light, with means auditory reaction times being 140-160 m/sec and visual stimulus takes 20-40m/sec. He mentioned also that reaction time to touch is intermediate, at 155m/sec.

Differences in reaction time between these types of stimuli persist whether the subject is asked to make a simple response or a complex response. Kosinski (2005) also found out that visual stimuli that are longer in duration elicit faster reaction times and got the same result for auditory stimuli. He continued that the difference between reaction time to light and sound could be eliminated if sufficiently high stimulus intensity was used. There are three major factors which typically occur when reaction time is measured. For example, the subject is often (not always) given a “warning signal” which alerts him or her that a “stimulus signal” will occur, to which the subject must respond. The warning signal and the stimulus signal could be in any sensory modality, for example, vision, hearing or touch, and the required response can be any designated movement involving part or all of the body. The purpose of the for-period, which usually ranges from one to five seconds, is to guard against the subject anticipating when the stimulus signal will rise. Although there are examples of reaction time to signal stimuli, such as the starter’s gun in a spirit race, sports also provide us with situations where we must react quickly and choose among a variety of stimuli, for example, the hockey goal-keeper trying to anticipate where the shot will come from (Dick, 1992).

According to Beashel and Taylor (1996), choice reaction time gives us a measure of the ability to discriminate among several stimuli and decide on the response. A primary factor influencing decision-making is the number of possible stimuli, each requiring specific responses that are presented. It has been found that the reaction time gradually increases as the number of possible alternatives increases. This finding forms the basis of Hick’s law which maintains that there is a linear relationship between reaction time (decision-making time) and the amount of information to be processed

(Beashel and Taylor 1996). While the law itself may seem clinical, it can be translated into very practical suggestions. Many sports skills require rapid decision-making situations, for example, defending against a punch in boxing, intercepting a pass in netball, or blocking a shot in basketball. By deliberately increasing the number of stimulus-response alternatives you present to your opponent, you automatically delay his or her processing time. A sensible strategy would be to develop various shots, strokes, moves from a given situation, rather than always producing the one alternative which your opponent can process quickly (Beashel & Taylor, 1996). The more alternatives the opponent has to process, the longer will be the Reaction Time to the final move.

Another factor which affects the choice of reaction time is stimulus response compatibility or the extent to which a stimulus and the required response are matched in a “natural way”. For example, in a typical experimental situation, a subject may be required to respond to a flashing light by pressing a key of the same colour or the same side of the display. This is compatible situation. However, if the subject has to respond to a flashing light by depressing a key on the opposite side to the light, then we have less natural pairing and this is considered to be an incompatible stimulus response display (Beashel and Taylor, 1996). It is accepted that increasing compatibility decreases choice of reaction time. Practical examples in incompatible situations might be in sailing when the sailor has to move the tiller to the right for the boat to go left, or the aerobics instructor who faces the class while demonstrating movements left and right. The learner has to actually move in the opposite direction (unless the teacher has already reversed the moves) (Beashel and Taylor, 1996).

A final element, which influences choice of reaction time, is the nature and amount of practice. It is accepted that although practice does not greatly affect simple reaction time, it can have a pronounced effect in reducing choice of reaction time, especially when there are large numbers of alternatives or when compatibility is low. Essentially, highly skilled performers have spent hours practicing the myriad alternatives available to them so that they appear to almost process information automatically (Beashel and Taylor, 1996). The actual stimulus situation is no different, but the links between stimuli and responses appear more natural or compatible, thus reducing choice of reaction time. It is also during the decision-making process that a phenomenon known as the Psychological Refractory Period sometimes occurs. According to Beashel and Taylor (1996), there is only a “single-channel” through which all information must pass and this sometimes means that delays in processing will occur if there is more than one stimulus to be processed. For example, if a first stimulus is given to which the subject must respond, then a second stimulus is also given. Typically, the second stimulus will have to wait until the first stimulus has been processed. This delay in reacting to the second stimulus is known as the Psychological Refractory Period and is a common phenomenon in sport, for example, when a player fakes a shot. A basketball player may fake (first stimulus) to jump-shoot but he/she remains firmly on the ground. Meanwhile, his/her opponent jumps (first response) to try to block the faked shot. Once the opponent has begun his/her movement, the player can then dribble the ball past the airborne defender (second stimulus) by which time the defender realizes that he/she must quickly respond to the actual play (second response).

The other type of processing is known as response selection or more specifically, motor programme selection. This implies the selection of an already formulated response from memory (Beashel and Taylor, 1996). For example, a soccer player may decide that he/she needs to pass the ball to a teammate who is in a better position than he/she is. However, the question is how he/she selects the most appropriate action that will enable the pass getting to his/her teammate. His/her ability to do that is known as the response selection.

Classical explanations of these phenomena assumed the use of a motor programme. This predetermined set of neural commands, are structured before a movement begins, and controls the execution of each particular movement. It is now thought that rather than calling up a specific motor programme from central store, the performer calls upon an abstract programme rule. This is applied to a given situation by considering the initial starting conditions of the individual, the repertoire of similar responses, and the expected sensory consequences of the action. If variation caused by the type of reaction time experiment, type of stimulus, and stimulus intensity are ignored, there are still many factors affecting reaction time. One of the most investigated factors affecting time is “arousal” or state of attention including muscular tension. Reaction time is fastest with an intermediate level of arousal and deteriorates when the subject is either too relaxed or too tense. According to Kosinski (2005), it is found out that subjects, who had to react to an auditory stimulus by extending their leg, had faster reaction time if they performed a 3-seconds isometric contraction of the leg muscles prior to the stimulus. One might expect that the muscle contraction itself would be faster (because the muscle was

warmed up), but what was surprising was that the preconstruction part of the reaction time was shorter too. It was as if the isometric contraction allowed the brain to work faster.

Age is another factor that affects the reaction time. According to Welford (1980), reaction time shortens from infancy into the late 20s, then increases slowly until the 50s and 60s, and then lengthens faster as the person gets into his/her 70s, and beyond. He also reported that this age effect was more marked for complex reaction time tasks. Reaction time also becomes more variable with age. He also speculates on the reason for slow reaction time with age. It may be the tendency of older people to be more careful and monitor their responses more thoroughly. When troubled by a distraction, older people also tend to devote their exclusive attention to one stimulus, and ignore another stimulus, more completely than younger people. It was also found that old people who tend to fall in nursing homes had a significantly slower reaction time than those that did not tend to fall. Teenagers between 15-19 years have a reaction time of 187 m/sec for light stimuli and 158m/sec for sound stimuli (Welford, 1980).

Another factor that affects reaction time is gender. At the risk of being politically incorrect, in almost every age group, males have faster reaction times than females, and females disadvantage is not reduced by practice. Kosinski (2005) reported that mean time to press a key in response to a light was 220m/sec for males and 260m/sec for females; for sound the difference was 190m/sec for males and 200m/sec for females. He found out that almost all of the male-female difference were accounted for by the lag between the presentation of the stimulus and the beginning of muscle contraction. Muscle contraction times were the same for males and females.



In a surprising finding by Kosinski (2005), he found that gradual dehydration (loss of 2.6% of the body weight over a 7-day period) caused females to have lengthened choice of reaction time. But he added that while men were faster than women at aiming at a target, the women were more accurate. It was also found out, that it is the same in men and women (Kosinski, 2005). Another factor that affects reaction time is left and right hand. The hemisphere of the cerebrum is specialized for different tasks. The left hemisphere is regarded as the verbal and logical brain and the right hemisphere is thought to govern creativity and spatial relations, among other things. Also, the right hemisphere controls the left hand and left hemisphere controls the right hand. This has made researchers like Boulinquesz, Bartelemy, Dane and Erzurumluoglu think that the left should be faster at reaction times involving spatial relationships such as pointing at a target (Kosinski, 2005). They also found out that among handball players, the left-handed people are faster than right-handed people when the test involved the left hand, but there was no difference between reaction times of the right and left-handers when using the right hand, although right-handed male handball players have faster reaction times than right-handed women. They concluded that left-handed people have an inherent reaction time advantage. In an experiment using a computer mouse, they found, however, that right-handed people were faster with their right hand as expected, but left-handed people were equally fast with both hands. The preferred hand is generally faster. However, the reaction time advantage of the preferred over the non-preferred hands was so small that they recommended alternative hands when using a computer mouse (Kosinski, 2005).

Direct and peripheral vision is another factor that affects reaction time. According to Welford (1980), visual stimuli perceived by different portions of the eye produce

different reaction times. The fastest reaction time comes when a stimulus is seen by the cone that is when the person is looking right at the stimulus. If the rods pick up the stimulus, that is, around the edge of the eye, the reaction is slower. It is also true that visual stimulus in central vision shortened the reaction time to a stimulus in peripheral vision, and vice versa.

According to Sanders (1998), practice and errors is another factor that affects reaction time. He showed that, when subjects are new to a reaction time task, their reaction times are less consistent than when they have had an adequate amount of practice. Also, if a subject makes an error in pressing the spacebar before the stimulus is presented for instance, subsequent reaction times are slower, as if the subject is being more cautious. Kosinski (2005), found that reaction time to a visual stimulus decreased with three weeks of practice and also that the effect of practice lasted for at least three weeks. He also indicated that training older people to resist falls by stepping out to stabilize themselves did improve their reaction time.

Fatigue is also seen as another factor that affects reaction time. It is found that, reaction time gets slower when the subject is fatigued. It is observed also that this deterioration, due to fatigue, is more marked when the reaction time task is complicated than when it is simple. Mental fatigue, especially sleepiness has the greatest effect. Welford (1980) found no effect of purely muscular fatigue on reaction time. He also found that 24 hours of sleep deprivation lengthened the reaction time of 20-25 year old subjects, but had no effect on the reaction times of 52-63 year old subjects. He studied workers who were allowed to take a nap on the job, and found that although the workers thought the nap had improved their alertness, there was no effect on choice reaction.

Distraction is also a factor that has an effect on reaction time. The study showed that distraction increased reaction time. It is clear that college students given a stimulated drinking task had longer reaction times when giving simultaneous auditory tasks. The conclusion is drawn about effects of driving while using a cellular phone. Welford (1980) found that subjects strapped to a platform that periodically changed orientation had slowed reaction time before and during platform movement. Under distraction as a factor, reaction time to auditory stimuli is more affected than response to visual stimuli.

Warning of an impending stimulus can also affect reaction time. Welford (1980) reports that, reaction times are faster when the subject has been warned that a stimulus will arrive soon. In the reaction time programme, the delay is never more than 3sec, but Welford (1980) reports that even 5 minutes of warming helps. He also found out that as long as the warning was longer than about 0.2sec, the shorter the warning, the faster reaction time was. This effect probably occurs because attention and muscular tension cannot be maintained at high level for more than a few seconds (Welford 1980).

According to Kosinski (2005), subjects who had drunk an impairing dose of alcohol reacted faster when they were warned that this was enough alcohol to slow their reaction time. Unwarned subjects, who were drunk, suffered more decreased reaction times. However, the warned subjects were also less inhibited and careful in their responses. Even subject who drank some non-alcoholic beverage and then were warned falsely about impairment by alcohol, reacted faster than unwarned subjects who drank the same beverage.

Welford (1980) and Sanders (1998) observed that when there are several types of stimuli, reaction time would be faster where there is a “run” of several identical stimuli

than when the different types of stimuli appear in mixed order. This is also called the “sequential effect”. This is also a factor that affects reaction time. They also found that the shifting of attention between two different types of task caused an increase in reaction time to both tasks.

Kosinski (2005) also found that, reaction time is faster when the stimulus occurred during expiration than during inspiration. Finger tremors are another factor that affects reaction time. According to Welford (1980), fingers tremble up and down at the rate of 8-10secs and reaction times are faster if the reaction occurs when the finger is already on the “downswing” part of the tremor.

Another factor that has effect on reaction time is personality type. Kosinski (2005) postulated that extroverted personality types had faster reaction times and Welford (1980) also said that anxious personality types had faster reaction times. Again, according to Kosinski (1980), Neurotic College students had more variable reaction times than their more stable peers. Exercise can also affect reaction time. Welford (1980) found that, physically fit individuals had faster reaction times. He also showed that subjects had the fastest reaction times when they were exercising sufficiently to produce a heart rate of 115 beats per minute. Kosinski (2005) found that, vigorous exercise did improve choice of reaction time, but only for 8 minutes after the exercise. Exercise had no effect on the percent of correct choices the subject made. On the other hand, there was no effect of exercise on reaction time in a test of soccer skill and that choice of reaction time and error rate in soccer players were not affected by exercise on stationary bicycle. He also found out that there is a no post-exercise effect in runners, but did find that exercise

improved reaction time during exercise. This was attributed to increase arousal during exercise.

Punishment can also affect reaction time. Shocking a subject when he reacts slowly does shorten reaction time. Simply making the subject feel anxious about his performance has the same effect, at least, on simple reaction time tasks (Kosinski, 2005). One other factor that is worth mentioning that affects reaction time is the use of stimulant drugs. Caffeine has often been studied in connection with reaction time. Kosinski (2005) found that moderate doses of caffeine decreased the time it takes subjects to find a target stimulus and to prepare a response for a complex reaction time task. He also found that the amount of caffeine in one cup of coffee can reduce reaction time and increase ability to resist distraction and can do so within minutes after consumption. He further said that soldiers in simulated urban combat maintained their marksmanship skill and their reaction times through a prolonged period without sleep better than when given caffeine. According to Sanders (1998), caffeine can reduce the slowing effect of alcohol on reaction time, but cannot prevent other effects such as body sway. On the other hand, he continued that, using software and “Spot-the-Dot” test, found that drinking one cup of either caffeinated or caffeine-free cola had no detectable effect on reaction time. The administering of an amphetamine-like drug to a group of elderly men did not make their reaction times faster, although it did make their physical responses more vigorous (Kosinski, 2005). Another very important factor that affects reaction time is intelligence. The tenuous link between intelligence and reaction time is reviewed by Kosinski (2005).

Serious mental retardation produces slower and more variable reaction times. Among people of normal intelligence, there is a slight tendency for more intelligent

people to have faster reaction times, but there is much variation between people of similar intelligence (Kosinski, 2005). The speed advantage of more intelligent people is greatest on tests requiring complex responses.

Another factor that affects reaction time is brain injury. According to Welford (1980), as might be expected, brain injury slows reaction time, but different types of responses are slowed to different degrees. He also said that high school athletes with concussions and headaches a week after injury had worse performance on reaction time and memory test than athletes with concussions, but no headache a week after injury. Minor upper respiratory tract infections slow reaction time, make mood more negative, and cause disturbance of sleep (Kosinski, 2005). Starting and stopping a stopwatch is a good measure to test how quickly one reacts to stimuli, but others like the stick drop test and “Nelson-Choice Response Movement Test” are all good measures for testing reaction time.

## **2.10 Summary of Literature Review**

The purpose of the study was to use University of Illinois test designed by American Alliance of Health, Physical Education, Recreation and Dance (AAHPERD) in 1986 compare the motor skill-related physical fitness status of students of Hohoe Municipality, in the Volta Region of Ghana. The assessment measured the six components of motor skill-related physical fitness. These components were agility, balance, coordination, power, speed and reaction time. Several test options were available for each component but only two were selected for each area.

Coordination can simply be defined as the ability to use the sense with the body parts to perform motor tasks smoothly and accurately. It can be defined in other words as the ability to integrate the senses; visual, auditory and proprioceptive with motor function, to produce smooth, accurate and skilled movement. Most bodily motions, even simply holding out a hand, involve the precise, accurate movements of dozens of muscles. In order for the body to move uninhibited, there must be smooth synchronization of dozens of muscles. Differential relaxation or controlled tension attributable to the reciprocal action of agonist and antagonist muscle provides for coordination movement without undue fatigue. The nerve signals are processed by the small, rear, wrinkled part of the brain, called the cerebellum, before they pass out to the muscles. This ensures the resulting action to be smooth and coordinated. The term coordination is also applied to complex physical actions controlled by the brain and nervous system such as catching a ball, playing a piano, or riding on roller blades. The body's sensory systems such as sight, touch and balance and its muscular system all work together to make the movements smooth and skilful. Various parts of the body may be involved such as hand-eye coordination, eye-foot coordination, kicking and catching a ball, etc.

The breaststroke in swimming can help in demonstrating what is meant by coordination, in that a person can learn the arm stroke and the kick separately. However, a maximum performance will result only if these two parts that were separately learnt are combined in a smooth flow of movement. Sequence in a skill is another example of coordination. When two forces are added sequentially, the exact time that the second force is initiated is crucial to performance. If it is started too soon or too late,



performance decreases. A javelin thrower, for example, must be able to sequentially perform each segment of the motor task of javelin throwing at the correct time or the performance will be minimized. The cross-over step for instance must occur at the appropriate time prior to the release for coordinated effort. The number of successful alternate-hand wall tosses in a specified period of time or by tossing a tennis ball very high and catching it may measure coordination. Kicking a moving ball requires coordination as well.

Most experts classify power as skill-related component of fitness, because it is partially dependent on speed. On the other hand, power is also dependent on strength and can be classified as a health-related component as far as strength is involved. This power falls somewhere in-between the two distinct groups of fitness attributes. Power is, therefore, defined as the ability to contract the muscles with speed and force in one explosive act. In other vein, power is the ability to transfer energy into force at a very fast rate. The use of power is not limited to sport and activities only. We use power extensively in our daily activities every time we apply a force to move something quickly.

The demonstration of power and strength is typical in events like long jump, putting the shot, throwing the discus and hitting a baseball for a distance. Muscles are used to apply force at a rapid rate to give the body or the object the necessary momentum to carry it to the desired distance—in a formula form,  $\text{power} = \text{force} \times \text{velocity}$ . Power is certainly necessary for a performer to survive or excel in athletics and even to enjoy successful participation in recreational games such as tennis, handball and golf. Many occupations even require power in some form for their tasks. The energy for our

muscular power comes from the anaerobic system. It can easily be measured by vertical jumps or standing broad jumps for power in the legs and throwing for a distance, which will test for power in the arms.

Reaction time is simply defined as the time elapsed between stimulation and the beginning of reaction to that stimulation. It can also be defined as the amount of time between the presentation of an unanticipated stimulus and the start of a response. It is important to emphasize that reaction time does include one's state of mental alertness. It adds up to the output, especially in terms of running speed. Although there are examples of reaction time to single stimuli, such as the starter's gun in a sprint race. Sports also provide us with situations where we must react quickly and choose among variety of stimuli, for example, the handball goalkeeper trying to anticipate where the shot will come from. Starting and stopping a stopwatch is a good measure to test how quickly one reacts to stimuli. But others like the Stick Drop Test and Nelson Choice- Response movement test are all good for testing reaction time.

Speed on the other hand is defined as the production to repeated maximal muscular contractions over a short distance within a minimal period of time. Speed can be improved by practice. For example, speed in running can be increased if one should learn to run in the proper manner. The foot should recover this position as quickly as possible, recover in that position (so that it makes the leg a shorter lever) and in the downswing stay dorsiflexed before impact, losing their pre-stretch (losing power). This increases contact time and allows them to contact the ground early. Every time an athlete hits the ground the first part of contact involves losing momentum. This can be minimized by maintaining dorsiflexion and having a fast moving backward (active) foot.

Obviously, movement time is decreased, if one stands too straight or too far forward when running for speed.

Speed is essential for the good shot stop in baseball, the football back, the fencer, and the sprinter. Running a distance for time is the most widely accepted measure for speed. However, the distance must be sufficiently short so that cardio- respiratory endurance does not become a limiting factor. The 50-metres dash and the 50 metres sprint with flying start are mainly used to measure running speed.



## CHAPTER THREE

### 3.0 METHODOLOGY

The aim of this study was to compare the motor skill performance levels of students with hearing-impairment and students without hearing-impairment in the Hohoe municipality. This chapter, therefore, was discussed under the following sub-headings:

- Research Design
- Population
- Sample and Sampling Technique
- Instrumentation
- Validity and Reliability of the Test Instrument
- Data Collection Procedure
- Data Analysis

#### 3.1 Research Design

A cross-sectional design was used in conducting this study. Cross-sectional research is a research method often used in developmental psychology, but also utilized in many other areas including social science and education. This type of study utilizes different groups of people who differ in the variable of interest, but share other characteristics such as socio-economic status, educational background, and ethnicity. For example, researchers studying developmental psychology might select groups of people who are remarkably similar in most areas, but differ only in age. By doing this, any

differences between groups can presumably be attributed to age differences rather than to other variables.

A cross-sectional design can also be defined as a quasi-experimental design between subjects which the people involved are observed at different ages and, or at different periods of time in a time-based sequence (Heiman, 2002).

Cross-sectional study is observational in nature and is known as descriptive research, not causal or relational. Researchers record the information that is present in a population, but they do not manipulate variables. This type of research can be used to describe characteristics that exist in a population, but not to determine cause-and-effect relationships between different variables. This method is often used to make inference about possible relationships or to gather preliminary data to support further research and experimentation.

It is also known as cross-sectional analyses, transversal studies, prevalence study from a class of research methods that involve observation of all of a population, or a representative subset, at one specific point in time. It differs from case-control design in that it aims to provide data on the entire population under study, whereas case-control design typically includes only individuals with a specific characteristic, with a sample, often a tiny minority, of the rest of the population.

Cross-sectional design is a descriptive study (neither longitudinal nor experimental). Unlike case-control study, it can be used to describe, not only the odds ratio, but also absolute risks and relative risks from prevalence (sometimes called prevalence risk ratio, or PRR). It may be used to describe some features of the population, such as prevalence of an illness, or may support inferences of cause and

effect. Data were collected to determine the current motor skill-related physical fitness levels of the two groups of students to find out if any significant difference existed between them.

Regardless of the type of research you conduct, under a cross-sectional design you collect data over a short and fixed period of time. In relation to survey research, Ruth Palmquist at the University of Texas notes that "Cross-sectional surveys are used to gather information on a population at a single point in time." For instance, if you conduct a survey asking people their opinions of the President, you only know how that population feels when you asked; you have no information regarding how attitude or opinion changed over time. In other types of work, such as medical research, you assess "outcomes and exposures... at a moment in time, without either forward or backward timing," as noted at the Yale University School of Medicine website.

Professor Saint Germain (2006) lists several advantages of cross-sectional research. She claims that it allows you to collect large amounts of data from a large number of people on a wide variety of subjects. These features often mean that the data is of use to researchers from various disciplines. Saint-Germain also states that cross-sectional research works well for exploratory studies. This makes it useful for students who have yet to develop the skills or obtain the time and resources necessary to execute more sophisticated research designs.

A great advantage of cross-sectional designs is that the study can be conducted and finished easily and fairly quickly. However, a disadvantage of these types of designs is that the conditions might become different in terms of how many confounding variables there are (Heiman, 2002).

While a basic cross-sectional research design can be cost-effective, Saint Germain warns that as the size of your sample or the number of variables increases, so does the cost of executing your project. In addition, cross-sectional research does not allow you assess "facts about 'time order' of exposure and effect, in other words whether one preceded the other," according to Yale's website. Simply put, you cannot uncover details about "cause and effect," according to Saint Germain.

### **3.2 Population**

The target population was the students of Volta School for the Deaf and all basic school students in the Hohoe Municipality. Students of Volta School for the Deaf were with hearing-impairment, while their counterparts from the other basic schools were students without hearing-impairment.

### **3.3 Sample and Sampling Technique**

Volta School for the Deaf was selected purposely for the study because it was the only school for the deaf in the region and for that matter in the Hohoe Municipality. A simple random sampling technique was used to select St. Francis Junior Secondary School from among mixed schools in the municipality that had students without hearing-impairment. The population of Volta School for the Deaf was 250, made up of 159 boys and 91 girls. St. Francis Junior Secondary School on the other hand, had a student population of 348, constituting 228 boys and 120 girls. Volta School for the Deaf had two categories of students. The students who have hard of hearing problems were 10 and those with total deafness number 240. However, in the absence of reliable gadgets to



certify the level of deafness in the students, the researcher relied on the statistics provided by the school and random sampling was used to select only those with total deafness.

As a result of the breakdown of the target population into boys and girls, it was clear that there were more boys in both schools than girls. A sample frame of all students from each class was obtained from the two schools and a table of random numbers was used to select the samples from each school. A stratified random sampling technique was used to select 30 boys and 20 girls from each school for the study. This made the total sample from the two schools to be 60 boys and 40 girls.

### **3.4 Instrumentation**

The University of Illinois Test Instruments designed by American Alliance of Health, Physical Education, Recreation and Dance (AAHPERD) in 1986 was used to collect data. The test items included:

- 30m dash for running speed.
- Stork stand test for static balance.
- Bass test for dynamic balance.
- Vertical jump test for muscular power in the legs.
- Throwing a medicine ball over a distance for muscular power in the arms.
- Alternate hand-wall toss test for eye-hand coordination.
- Kicking a moving ball with the foot test for eye-foot coordination.
- Stick drop test for reaction time.
- Nelson Choice-Response movement for reaction time.

- Illinois Agility Run Test for agility.

### **3.5 Validity and Reliability of Test Instrument**

Test validity refers to the degree to which the test actually measures what it claims to measure and the extent to which inferences, conclusions, and decisions made on the basis of test scores are appropriate and meaningful. Also according to Amin (2005), validity is the extent to which the instruments used during the study measure the issues they are intended to measure. As a standardised instrument it has been validated and is widely used in the United States of America, Europe and other parts of the world for all categories of people.

Test reliability refers to the degree to which a test is consistent and stable in measuring what it is intended to measure. Reliability will depend upon how strict the test is conducted and the individual's level of motivation to perform the test. Davis et al. (2000). Also reliability is the extent to which the measuring instrument will produce consistent scores when the same groups of individuals are repeatedly measured under the same conditions (Amin, 2005). As a validated instrument its reliability is assured.

### **3.6 Data Collection Procedure**

The data on each subject's performance on the tests and the measurements of motor skill-related physical fitness components were collected with the help of ten (10) research assistants who were physical education teachers and have knowledge of test and measurement. The research assistants were trained on the mode of the assessment.

Written permission was sought from the two schools four weeks before the day for the testing (see appendix A&B). Four separate days were used to collect the data for the two groups. On the first two days, at the St. Francis College of Education field, all the subjects from St. Francis Junior Secondary School were tested using the twelve test items. The participants were briefed a day earlier and were given details of what was entailed in the test and measurement. Just after morning assembly, the students in the company of three of their teachers arrived on the field for the testing. After taking the students round the 12 test venues on the field, the research assistants took them through warm-up and stretching for about twenty minutes before the testing began. Likewise, on the third and fourth days at Hohoe Evangelical Presbyterian Secondary School (HEPSS) field, the subjects from Volta School for the Deaf were conveyed to the field on board the school bus in the company of three of their teachers for the test. The accompanying teachers from Volta School for the Deaf played the role of sign language interpreters. The HEPSS field has the same facilities just like the St. Francis College of Education Park. The two are the same in size as well. The students arrived at about 8:00am and were quickly shown round the testing areas. They were also taken through vigorous warm-up and stretching by the research assistants before the testing began.

The testing started at 8.45am on each day and ended at 12.45pm. The research assistants were given special assignments which they carried out throughout the testing for the two days. The research assistants were responsible for a component each. Recording cards were given to each student who gave them to the research assistants on the arrival for the scores to be recorded.

The description of the test items and how they were conducted were as follows:-

### **30m Dash for Running Speed**

Purpose: To measure running speed.

Apparatus: Running track, pencil, paper and a stop watch.

Activity: From a marked starting position or point, the participant ran to a finish line as fast as possible starting from a crouch position. (One attempt only but in case of a false start another chance was given)

Score: The seconds (time) made was recorded as the score obtained, to the nearest whole number.

### **Stork Balance Stand**

Purpose: To measure the static balance of the performer.

Apparatus: Flat, non-slip surface, pencil, paper and stop watch.

Activity: From a comfortable standing position, the participant placed the hands on the hips and then lifted one leg and placed the toes against the knee of the other leg. On command, the participant raised the heel of the standing leg and stood on the ball of the foot for as long as possible.

Score: The seconds (time) the participant was able to balance on the ball of the foot was recorded as the score to the nearest whole number.

### **The Bass Test**

Purpose: To measure the ability to maintain balance while in motion (dynamic balance).

Apparatus: Eleven circles of 24cm diameter, measuring tape and stopwatch.

**Activity:** Standing on the dominant foot in the first circle, the participant leap forward from one circle to the next, alternating the legs. Only the ball of the foot was to touch the ground, and the participant stood in each circle for five seconds before leaping into the next circle, (one assistant was assigned to time- 5sec).

**Score:** The participant who finished successfully scored the full mark of 50. A successful leap in each circle was 5 marks. A failure at any point was minus 3 points (one attempt only).

### **Illinois Agility Run Test**

**Purpose:** To measure the agility of the subjects.

**Apparatus:** A stop watch, a running space and 4 skittles.

**Activity:** With the skittles arranged three (3) metres apart in a straight line, the performer lay prone with his palms by the shoulders. On the command „go“, the performer got up on his/her feet and ran the distance round the skittles as fast as possible (one attempt only).

**Score:** The seconds (time) used in completing the distance was recorded as the score (to the nearest whole number).

### **The Alternative Hand-Wall Toss Test**

**Purpose:** To measure eye-hand coordination.

**Apparatus:** Tennis ball, a stop watch and a smooth wall.

**Activity:** Standing two metres away from a smooth wall and at a signal, participant threw a tennis ball with the right hand against the wall and caught it with the left hand. He/she then threw it with his/her left hand and caught it with the right hand. The participant was not allowed to move from where he/she stood (one attempt only).

**Score:** The number of successful throws against the wall and catching in 30 seconds was recorded as the score.

### **Kicking a Moving Ball with the Foot**

**Purpose:** To measure eye-leg coordination;

**Apparatus:** A football and a playing field.

**Activity:** From a starting line, the football was thrown into the path of the performer. The performer sprinted within 6 metres to meet the ball as he/she was moving and kicked it.

**Score:** Any successful contact of the ball scored 50 points.

### **Vertical Jump Test**

**Purpose:** To measure the explosive power in the legs.

**Apparatus:** A piece of chalk and a smooth wall.

**Activity:** Holding a piece of chalk which was of the same height with the fingertips, participant stood with both feet flat on the ground with one side to the wall, reached out and marked a spot as high as possible on the wall. He then jumped upwards from both feet as high as possible, and marked the spot for the highest jump on the wall.

**Score:** The distance between the reaching height and the jumping height gave the score.

### **Throwing a Medicine Ball**

Purpose: To measure muscular power in the arms.

Apparatus: A medicine ball and a tape measure.

Activity: From a starting line, the performer threw a medicine ball with two arms over-head over a distance. The performer was allowed a maximum of three steps forward (one attempt only).

Score: The distance measured was recorded as the score.

### **The Stick Drop Test**

Purpose: To measure reaction time.

Apparatus: A yard stick, a table and a chair.

Activity: The performer sat on a chair next to a table so that the elbow and lower arm rested on the table comfortably. The heel of the hand also rested on the table so that only the fingers and the thumb extended beyond the edges of the table. The partner held the yardstick at the very top, allowing the lower end to dangle between the thumb and the fingers of the performer. Without warning the partner let go of the stick and the performer caught it with his/her thumb and finger as quickly as he/she could (one attempt only).

Score: The score was the number of centimetres made above the thumb and index finger. The higher the number of centimetres, the better the score

### **Nelson Choice-Response Movement Test**

Purpose: To measure the ability to react and move quickly.



Apparatus: A stopwatch and a flat surface.

Activity: In the test, two side lines were marked 14 metres apart with a middle line at 7 metres. The performer assumed a ready stance on the 7 metres line. The tester waved the distance of his/her choice for the performer to move that way (one attempt only).

Scores: The seconds (time) taken to cross the end line was recorded as the test score.

### **3.7 Data Analysis**

The data were analyzed using the Statistical Package for Social Sciences (SPSS) windows 15.0. The data collected were entered onto the SPSS programme and analyzed using the Mean, Standard Deviation, Standard Error of Mean and Independent sample t-test. The independent sample t-test used to test for the significant differences was chosen because there were only two different groups for comparison. The independent sample t-test was used to find out whether any differences existed among the students with hearing-impairment and the students without hearing-impairment concerning their motor skill-related physical fitness level. It tested the statistical hypotheses that; there were no significant difference in motor skill-related physical fitness between students without hearing-impairment and those with hearing-impairment. An alpha level of 0.05 (2 tailed) was used in analysing data.

## CHAPTER FOUR

### RESULTS/ FINDINGS AND DISCUSSIONS

The purpose of the study was to compare the motor skill performance levels of students with hearing-impairment and students without hearing-impairment and to find out if any differences existed between them. The chapter presents the analyses of data obtained from the students with hearing-impairment of the Volta School for the Deaf and students without hearing impairment of St. Francis Junior Secondary School all in Hohoe. It also presents a summary of findings and discussions of the results.

#### 4.1 Results

At the preliminary stage of the analysis were the numerical coding and entry of data into statistical software –SPSS (Statistical Package for Social Sciences) and data were organised to identify the existence of observed pattern and, or differences across the target groups. Key statistics were mean, standard deviation and standard error of mean of motor skill-performance levels for comparison between the target groups.

In testing the significance of the observed differences or pattern, the t-test statistical technique was used where the mean, standard deviation and standard error of mean of the test scores on motor skill-performance levels for the groups were compared.

#### Hypothesis 1

There would be significant difference between the students with hearing-impairment and non hearing-impairment in Speed Test

**Table 1: Independent samples t-test of the two groups in running speed (30m dash)**

Group	M	SD	SEM	N	df	T	Sig
Normal	5.680	0.794	0.112	50	98	6.093	.000(s)
Deaf	4.680	0.794	0.112	50			

[P < .05, S = significant.

Table 1 illustrated the test values obtained by both the students with hearing-impairment and students without hearing-impairment. The independent samples t-test analysis showed that there was significant difference between the students with hearing-impairment and the students without hearing-impairment with [t (98) = 6.093, P < .05]. While the students without hearing-impairment obtained a mean (M) of 5.680, the students with hearing-impairment obtained a mean (M) of 4.680. The two groups obtained the same standard deviation (S) of 0.794 and a standard error of mean (SEM) of 0.112. The hypothesis which stated that there would be significant difference between the two groups regarding running speed (30m dash) could not, therefore, be rejected.

**Table 2: Independent samples t-test of the two groups in running speed (50m sprint)**

Group	M	SD	SEM	N	df	T	Sig
Normal	4.980	0.869	0.123	50	98	0.230	.819(ns)
Deaf	4.940	0.818	0.116	50			

P > .05, NS = not significant.

From table 2, the students without hearing-impairment obtained a slightly higher mean (M) than their counterparts with hearing-impairment. The students without hearing-

impairment obtained a standard deviation (S) of 0.869, whilst their counterparts with hearing-impairment obtained 0.818. The standard error of mean (SEM) of the students without hearing-impairment was also slightly higher than that of the students with hearing-impairment. The independent samples t-test analysis showed that there was no significant difference between students with hearing-impairment and those without hearing-impairment at  $[t(98) = 0.230, P > .05]$ . Consequently, the hypothesis which stated that there would be a significant difference regarding running speed (50m sprint) was rejected.

### Hypothesis 2

There would be significant difference between the students with hearing-impairment and non hearing-impairment in Balance Test.

**Table 3: Independent samples t-test analysis of the two groups in static balance**

Group	M	SD	SEM	N	df	T	Sig
Normal	63.440	19.130	2.705	50	98	3.945	.000(s)
Deaf	43.540	26.539	3.753	50			

$P < .05$ , S= significant.

Table 3 showed the test values obtained by both students with hearing-impairment and those without hearing-impairment on static balance. A comparison of the means (M) indicated that while students with hearing-impairment obtained 43.540 as mean value, students without hearing-impairment obtained 63.440 as their mean value. This showed that the students without hearing-impairment were better in terms of static balance.

The independent samples t-test showed that there was significant difference between the students with hearing-impairment and those without hearing-impairment at  $[t(98) = 3.945, P < .05]$ . This depicted that the hypothesis which stated that there would be significant difference between the students with hearing-impairment and those without hearing-impairment regarding balance (static balance) could not be rejected.

**Table 4: Independent samples t-test analysis of the two groups in dynamic balance**

Group	M	SD	SEM	N	df	T	Sig
Normal	46.060	8.860	1.253	50	98	3.025	.004(s)
Deaf	41.200	6.354	0.899	50			

$P < .05$ , S = significant.

Table 4 outlined the test values obtained by both the hearing-impaired and non hearing-impaired students on the Bass Test for dynamic balance. Whereas the students without hearing- impairment had a mean of 46.060, the students with hearing-impairment had 41.200 as the mean value. This showed that the students without hearing-impairment performed better in the dynamic balance test than their counterparts without hearing-impairment.

The independent sample t-test showed that there was significant difference between students with hearing-impairment and those without hearing-impairment at  $[t(98) = 3.025, P < .05]$ . This also indicated that the hypothesis, which stated that there would be significant difference regarding balance (dynamic balance), could not be rejected.

### Hypothesis 3

There would be significant difference between the students with hearing–impairment and non hearing-impairment in Power Test.

**Table 5: Independent samples t-test analysis of the two groups in muscular power of the leg**

Group	M	SD	SEM	N	df	T	Sig
Normal	32.380	8.369	1.184	50	98	-2.587	.113(ns)
Deaf	36.440	6.606	0.934	50			

P < .05, NS =Not significant.

Table 5 illustrated the test values obtained by both students with hearing-impairment and those without hearing-impairment in vertical jumps to test the power in the legs. Whereas students without hearing-impairment obtained a mean of 32.380, standard deviation of 8.369 and standard error of mean of 1.184, the hearing-impaired also obtained 36.440 as mean, 6.606 as standard deviation and 0.934 as standard error of mean. The independent samples t-test indicated that there was no significant difference between the students with hearing-impairment and those without hearing-impairment at [t (98) = -2.587, P < .05]. Thus, the hypothesis, which stated that there would be significant difference between the two groups regarding their muscular power in the legs, was therefore rejected.

**Table 6: Independent samples t-test analysis of the two groups on muscular power in the arms**

Group	M	SD	SEM	N	df	T	Sig
Normal	10.290	2.843	0.402	50	98	-6.133	.312(ns)
Deaf	13.080	3.300	0.467	50			

P > .05, NS = not significant.

Table 6 showed the muscular power test values obtained by the two groups. Whereas the students with non hearing-impairment obtained 10.290 for mean, the students with hearing-impairment obtained 13.080 as mean. This indicated that the students with hearing-impairment were more powerful in the arms.

The independent samples t-test showed that there was no significant difference between the students with hearing-impairment and those without hearing-impairment at [t (98) = -6.133, P < .05]. As such the hypothesis, which stated that there would be significant difference between the two groups regarding muscular power in the arms, was rejected.

#### **Hypothesis 4**

There would be significant difference between the students with hearing-impairment and non hearing-impairment in eye-hand Coordination Test.



**Table 7: Independent samples t-test analysis of the two groups in eye-hand coordination**

Group	M	SD	SEM	N	df	T	Sig
Normal	10.780	8.551	1.209	50	98	3.269	.028(s)
Deaf	6.820	8.012	1.133	50			

P < .05, S= Significant.

Table 7 illustrated the test values obtained by both students with hearing-impairment and those without hearing-impairment in the alternate hand wall ball juggle test for eye-hand coordination. While the students with hearing-impairment obtained a mean value of 6.820, a standard deviation of 8.012 and a standard error of mean of 1.133, their counterparts without hearing-impairment obtained a mean value of 10.780, a standard deviation of 8.551 and a standard error of mean of 1.209. The independent samples t-test indicated that there was significant difference between the students with hearing-impairment and the students without hearing-impairment at [t (98) = 2.269, P <.05]. However, the difference between the two groups indicated that the students without hearing-impairment were more coordinated in terms of their eye-hand coordination. Consequently, hypothesis which stated that there would be significant difference between the student"s with hearing-impairment and those without hearing-impairment regarding their eye-hand coordination could not be rejected.

**Table 8: Independent samples t-test analysis of the two groups in eye-foot coordination**

Group	M	SD	SEM	N	df	T	Sig
Normal	10.300	8.416	1.190	50	49	1.097	.278(ns)
Deaf	8.600	7.426	1.050	50			

P > .05, NS = Not significant.

Table 8 showed the test values obtained by both students with hearing-impairment and those without hearing impairment in the eye-foot coordination test of kicking a moving ball. While the students with hearing-impairment obtained 8.600 as mean, the students with normal hearing obtained 10.300.

The independent samples t-test showed that there was significant difference between the students with hearing-impairment and the students without hearing-impairment at [t (98) = 1.097, P < .05]. Thus, the hypothesis, which stated that there would be significant difference between the hearing-impaired and students without hearing-impairment regarding eye-foot coordination, could not be rejected.

### **Hypothesis 5**

There would be significant difference between students with hearing-impairment and non hearing- impairment in Reaction Test.

**Table 9: Independent samples t-test analysis of the two groups in reaction time**

Group	M	SD	SEM	N	df	T	Sig
Normal	23.020	5.153	0.729	50	98	-3.176	.330(ns)
Deaf	25.700	3.559	0.503	50			

P > .05, NS = not significant

Table 9 outlined the values obtained by both the hearing-impaired and those without hearing-impairment in the stick drop test for reaction time. Whereas the students with hearing-impairment had a mean value of 25.700, their counterparts without hearing-impairment had a value of 23.020. This showed that the students with hearing-impairment reacted faster in the stick drop test than their counterparts without hearing-impairment. The independent samples t-test of  $[t(98) = -3.179, P < .05]$  showed that the hypothesis which stated that there would be significant difference between the two groups regarding reaction time using the stick drop test was not significant and, therefore, was rejected.

**Table 10: Independent samples t-test analysis of the two groups in Nelson-Choice-**

**Response movement**

Group	M	SD	SEM	N	df	T	Sig
Normal	1.932	0.239	0.034	50	98	6.403	.000(s)
Deaf	1.660	0.165	0.023	50			

P < .05, S = Significant.

Table 10 illustrated the test values obtained by both students with hearing-impairment and those without hearing-impairment in the Nelson-Choice Respond Movement Test for reaction time. While the students with hearing-impairment obtained a

mean value of 1.932, their counterparts without hearing-impairment obtained a mean value of 1.660. The independent samples t-test of  $[t(98) = 6.403, P < .05]$  showed that the hypothesis, which stated that there would be significant difference between the two groups regarding reaction time, could not be rejected.

### Hypothesis 6

There would be significant difference between students with hearing-impairment and non hearing- impairment in Agility Test.

**Table 11: Independent samples t-test analysis of the two groups in agility test.**

Group	M	SD	SEM	N	df	T	Sig
Normal	34.532	7.119	1.007	50	98	10.451	.000(s)
Deaf	20.332	5.184	0.733	50			

$P < .05$ , S = Significant

Table 11 showed the test values obtained by both students with hearing-impairment and those without hearing-impairment in the Illinois Agility Run test. Comparing the mean values, the students without hearing-impairment obtained 34.532, whilst those with hearing-impairment obtained 20.332. The independent samples t-test of  $[t(98) = 10.45, P < .05]$  indicated that the hypothesis, which stated that there would be significant difference between the students with hearing-impairment and those without hearing-impairment regarding agility, was significant and therefore, could, not be rejected.

**Table 12: Independent samples t-test analysis of the two groups in South Eastern Missouri State University (SEMU) Agility Run test**

Group	M	SD	SEM	N	df	T	Sig
Normal	17.611	1.361	0.192	50	98	1.381	.174(ns)
Deaf	18.330	3.767	0.533	50			

P > .05, NS = not significant

Table 12 illustrated the test values obtained by both students with hearing-impairment and those without hearing-impairment in South Eastern Missouri State University (SEMU) Agility Run Test. A comparison of the means of the two groups showed that while the students with hearing-impairment obtained 18.330 as mean value, students without hearing-impairment had a mean value of 17.611. This showed that students with hearing-impairment performed slightly better than students without hearing-impairment.

The independent samples t-test of [t (98) = -1.381, P < .05] implies that the hypothesis which stated that there would be significant difference between the students with hearing-impairment and those without hearing-impairment regarding agility using the SEMU Agility Run Test was not significant and therefore was rejected.

#### **4.2 Discussions**

The finding on independent samples t-test of the two groups in running speed (30m dash) in Table 1 was not surprising because the students without hearing-impairment were expected to hear the command as well as see the signal. According to

Winnick (1995), lighting systems placed 50 meters in front of the starting blocks and the side of the track was used to signal the start of a race. Unfortunately, the lighting systems were not put in place thus leading to the low performance of the students with hearing-impairment. Also, according to Groves (1989), in individual sports and athletic events, physically able deaf children can, of course, excel. She added that just a few adaptations were necessary, thus, starting signals should be visible as well as audible. This was put in a different form by Sherrill (1993) that deaf students may demonstrate delays or perform below average simply because they do not understand test instructions or test instructions were not well explained.

According to Auxter et al., (1997), one characteristic that may be negatively affected by hearing-impairment was motor speed. They further explained that it would take a longer period for the child to process information and complete a motor act. Because of the late processing of information, Silvia Kauahuma who won two bronze medals at the 1997 Deaflympics Games for South Africa could not compete in the Olympic Games (Lieberman, 1999). It could also be added that due to continuous involvement in physical activities and the range of people to play with, the fitness levels of the pupils without hearing impairment seem better than the pupils with hearing-impairment. According to Siedentop (2001), one can improve his or her speed but to do so, there must be the use of training activities designed to be specific to the outcomes intended.

The findings on independent samples t-test of the two groups in running speed (50m sprint) in Table 2 revealed that the students with hearing-impairment performed better than the students without hearing-impairment. The students with hearing-

impairment obtained a mean (M) value of 4.940 while students without hearing-impairment obtained 4.980 as mean (M) value. Comparing the speed levels of the students with hearing-impairment on the 30m dash to the 50m sprints from a flying start, the findings revealed that, they performed better on the 50m sprints. In the 50m sprints, there was a 20m flying start, and they sprinted for the remaining 30m for time. It meant that the 30m with straight command was not favourable to the students with hearing-impairment but a flying start was better for them. Auxter et al., (1997), commented that one characteristic that may be negatively affected by hearing-impairment was motor speed. That is, the time it takes a child to process information and complete a motor act would be very long; it means that the 20m flying start is enough time for the deaf athlete to process the information.

The results showed that physically able students with hearing-impairment can perform well in some physical activities. According to Groves (1989), physically able deaf children can, of course, excel. This was emphasized by Beashel and Taylor (1996) that speed can be improved by practice (as well as increase in speed) if one runs in a proper manner. They explained further that it was obvious that movement time would decrease if one stood too straight or too far forward when running for speed.

The findings on independent samples t-test analysis of the two groups in static balance in Table 3, revealed the significant difference in performances between the students with hearing-impairment and those without hearing-impairment in the Stork Stance Test item. Statistical test values indicated that while the hearing-impaired obtained a mean (M) test value of 43.540, their counterparts without hearing-impairment obtained 63.440 as mean test value. The independent samples t-test value indicated that the

students without hearing-impairment were better in activities requiring static balance. This result tied up with similar results by Auxter et al., (1997), that impairment of the semi-circular canals, vestibule of the inner ear and or vestibular portion of the eighth cranial nerves has negative effect on balance. This was supported by Sherrill (1993), in her book “Adapted Physical Activity, Recreation and Sport: cross disciplinary and lifespan”, that performance in motor skills and patterns is the same as for hearing persons except when inner ear balance deficits exist.

This finding, notwithstanding, indicates that static balance was better in students without hearing-impairment than in students with hearing-impairment. According to Winnick (1995), one possible explanation is that if the semi-circular canals of the inner ear are damaged, balance problems are likely to occur. He explained further that these balance problems may, in turn, cause developmental delays.

The findings on independent samples t-test analysis of the two groups in dynamic balance in Table 4 revealed that the students with hearing-impairment cannot perform to standard in activities that required dynamic balancing. This was confirmed in Table 4 that the students without hearing-impairment were better in terms of dynamic balance. While the students with hearing-impairment obtained a mean value of 41.200, those without hearing-impairment obtained 46.060 as their mean test value. The independent samples t-test indicated that students without hearing-impairment were better on activities involving dynamic balance. This was supported by Akuffo (1998), that dynamic balancing is a problem to the students with hearing-impairment and that focus should be on activities that are challenging, like walking on a balance beam and so on. Also, according to Auxter et al., (1997), impairment of the semi-circular canals, vestibule of the inner ear and or



vestibular portion of the eighth cranial nerves has a negative effect on balance. Winnick, in his book “Adapted Physical Education and Sports”, supported the fact that if the semi-circular canals of the inner ear are damaged, balance problems are likely (Winnick, 1995). It was also reported that there is significantly depressed balance performance by children with sensory neural hearing-loss of below 65 decibels (Auxter et al., 1997).

According to Sherrill (1993), the inner ear governs both hearing and balance and that if the vestibular apparatus is damaged, static and dynamic balances are impaired. She also stated that dynamic balance has very low correlation with static balance and should be assessed and remediated separately. Balance is extremely task specific, so success on one balancing task cannot be generalized to other task, even those of the same type (Sherrill 1993).

The findings on independent samples t-test analysis of the two groups in muscular power of the leg as shown in Table 5, revealed no significant difference in performance between students with hearing-impairment and those without hearing-impairment regarding throwing of a medicine ball test. Statistical test values indicated that the independent samples t-test obtained showed that the students with hearing-impairment were stronger in the legs than the students without hearing-impairment. This was strongly supported by Auxter et al., (1997), that physical fitness and power are more prudent in some hearing-impairment. According to Sherrill (1993), field events showing power and strength are more popular among the hearing-impaired and the handicapped in general. This was supported by Crowe et al., (1981) that, there are several types of physical activities that develop power and strength in the hearing-impaired.

A deaf basketball star Michael Torres played in the United State of America (USA) basketball team at the Summer World Games in 2001, in Rome, Italy (Godsiff, June 24, 2003). It was evident that the power in Michael Torres, the deaf player, was just like that of the normal players. This goes to buttress the point raised by Akuffo (1998), that the students with hearing-impairment can perform physically and at the same level as their able-bodied counterparts.

The findings on independent samples t-test analysis of the two groups on muscular power in the arms in Table 6 revealed that the students with hearing-impairment obtained a mean value of 36.440 while those without hearing-impairment obtained a mean value of 32.380. The statistics from Table 5 indicated that the students with hearing-impairment looked very strong and had a lot of power in their legs. This was supported by Auxter et al., (1997), that physical fitness and power are more prudent in some students with hearing-impairment. This revealed that the students with hearing-impairment continuously participate in activities that have to do with power in the legs. And, according to Corbin et al., (2000), power is a combination of strength and speed, and is both health-related and motor skill-related. However, there is also a disagreement about the power and strength level of the students with hearing-impairment (Auxter et al., 1997). But the fact still remains that the hearing-impaired performed extremely better than the students without hearing-impairment in this study. This goes to buttress the point raised by Akuffo (1998), that the students with hearing-impairment can perform physically and at the same level as their able-bodied counterparts. Strassler Barry in his Magazine “World around You” also supported this where he mentioned Kevin Hall, a deaf golfer who was ranked as one of the best golfers in the world (Strassler, 1999).

The findings on independent samples t-test analysis of the two groups in eye-hand coordination in Table 7 produced a significant difference between the two groups. The independent samples t-test of the groups indicated that the students without hearing-impairment looked much more coordinated in terms of eye-hand coordination than their counterparts with hearing-impairment. It was also deduced that the size of the tennis ball used may also be a factor. Balancing and coordination are problems to the students with hearing-impairment and that focus should be on activities that are challenging, like walking on a balance beam and so on (Akuffo, 1998). Also, according to Auxter et al., (1997), impairment of the semi-circular canals, vestibule of the inner ear and or vestibular portion of the eighth cranial nerve has a negative effect on balance and coordination. In addition to that, Auxter et al., (1997), state that analysis of perceptual attributes important to skilled motor performance indicates that exteroceptors like eyes and ears as well as proprioceptors like vestibular and kinaesthetic receptors are important avenues for receiving information from the environment. Deficits in information from these senses may result in deficits in performance of physical activities that increases coordination and balance. They went further to state that impaired balance interferes with postural and locomotors efficiency as well as eye-foot and eye-hand coordination (Auxter et al., 1997). According to Lieberman's (1999) publication, "Sport is Life" on the Internet (<http://www.clercenter.gallaudet.edu>), coordination is influenced by the genetic make-up of the individual, as well as the individual's imagination, acquired skills and experience. As a result of the above statement, it means that, the hearing-impaired did not develop their eye- hand coordination during the school period.

According to Crowe et al., (1981), play in preschool years is important in learning social skills and in the development of motor skills. They further stated that the role of play, which is so important to social, psychological and motor aspects of development in typical children, is usually limited in deaf children (Crowe et al, 1981). Akuffo (1998) stated categorically that the pupils with hearing-impairment with vestibular dysfunction are uncoordinated and lack control of motor responses.

The findings on independent samples t-test analysis of the two groups in eye-foot coordination in Table 8 produced no significant differences in performance between the two groups. It revealed that the students with hearing-impairment were more coordinated in the eye-foot coordination. This is contrary to what Akuffo (1998) said, that the students with hearing-impairment are uncoordinated and lack control of motor responses.

Curtis Pride, a deaf soccer star played for the USA in the FIFA under 17 World Championship in China (Jamie, March, 2005). Though Curtis was deaf, he was coordinated and played with his colleagues efficiently. Fencer Frank Bartolillo represented Australia in the Athens Olympic Games in 2004 (Jamie, March, 2005). Fencing is a skill, where body movement is paramount, but Bartolillo was successful. This indicates that he was well coordinated. According to Pinchas (2004), Terence Parkin of South Africa took silver in the 200m-breast stroke at the Sydney Olympic Games in 2000. Though he was deaf, he was able to swim past able-bodied competitors to come second.

Hypothesis 5: there would be significant difference between students with hearing-impairment and those without hearing-impairment regarding reaction time.

The finding on independent samples t-test analysis of the two groups in reaction time on stick drop test in Table 9 revealed that, the reaction time of the students with hearing-impairment was far better than that of students without hearing-impairment. This indicated that there was no significant difference between the two groups with regards to stick drop test for reaction time. The independent samples t-test value of -3.179 indicates that the widely accepted view that the hearing-impaired are not quick to react cannot always be true. For the test, the tested sits right in front of the tester; as a result all the senses of the tested are focused on the tester. This was contrary to what Auxter et al., (1997) said, that it takes a longer period for a student with hearing-impairment to process information and completes a motor act. Groves (1989) stated that the physically able deaf children can, of course, excel. They just needed some few adaptations and modification at the start. With the adaptations and the ability of the tested to visualize the tester, the performance of the students with hearing-impairment were faster in terms of stick drop test item for reaction time. The ability of students with hearing-impairment to react very fast and swift enabled Frank Bartolillo of Australia to compete in the fencing competition at the 2004 Athens Olympic Games (Jamie, March 2005).

The findings on independent samples t-test analysis of the two groups in Nelson-Choice Movement in Table 10 revealed that students with hearing-impairment could not perform to the standard of students without hearing-impairment in the Nelson Choice Movement test item for reaction time. While the students with hearing-impairment obtained a mean of 1.660, the students without hearing-impairment obtained a mean value of 1.932. The independent samples t-test value of 6.403 was very high and indicated that the students without hearing-impairment were faster in situations

concerning “think and move”. This was supported by Auxter et al (1997) that a stimulus sent must be processed before the body reacts to it. Auxter et al also stated that, the time it takes the child to process information and complete a motor act would be very long (Auxter et al, 1997). With this background, it was revealed that it took considerable time before the students with hearing-impairment reacted to the stimuli.

According to Sherrill (1993), students with hearing-impairment have poor reaction time where movement is concerned. Akuffo (1998) also stated that the students with hearing-impairment have problems in changing directions or body positions and therefore, have difficulty to perform specific sport and motor skills efficiently. Akuffo’s point indicates the tested ready to move may have to change to the other direction based on the direction indicated by the instructor. Also according to Beashel and Taylor (1996), the warning signal and the stimulus signal could be in any sensory modality. For example, vision, hearing or touch and the required response are any designated movement involving part or all of the body. It was also clear that several stimuli were given for the testee to decide on the response.

The findings on independent samples t-test analysis of the two groups in regarding agility in Table 1 revealed that students without hearing-impairment obtained a mean test value of 34.532 while their counterparts with hearing-impairment had a mean test value of 20.332. The findings were not as surprising as it confirmed the assumption of the Researcher that there would be significant difference between the two groups regarding this variable. This finding is supported by a statement that the students with hearing-impairment have problems in changing directions or body positions and therefore, have difficulty to perform specific sport and motor skills efficiently (Akuffo,

1998). It was clear that balance affects agility especially when the movement is very swift. According to Auxter et al., (1997), damage to the vestibule of the inner ear affects balance. This explains the fact that students with hearing-impairment with vestibule damage in the inner ear cannot be agile. This is also supported by Sherrill (1993), that balance is specific to task requirements and body reactions. This certainly cannot enhance agility in the students with hearing-impairment.

The findings on independent samples t-test analysis of the two groups in South Missouri State University (SEMU) Agility Run test in Table 12 showed that the students with hearing-impairment obtained a mean test value of 18.330 while the students without hearing-impairment obtained a mean test value of 17.611. Statistics from Table 12 indicates that the students with hearing-impairment were better, when it came to SEMU Agility run test. Comparing the results of Illinois Agility run to the SEMU, it was clear that the swift movements needed for Illinois Agility run was too much for the students with hearing-impairment but they coped with quite slower movement in the SEMU Agility run. According to Akuffo (1998), the children with hearing-impairment can perform physically and at the same level as their able-bodied counterparts. Contrary to what was said earlier that balance affect agility, it was not shown in this findings.



## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of the study was to compare the motor skill performance levels of students of hearing-impairment and those without hearing-impairment in the Hohoe Municipality and to find out if any differences existed. This chapter presents the summary, the conclusions and recommendations. Presentation of the subject matter is under the following sub-headings:

- i. Overview of research problem and methodology.
- ii. Summary of findings.
- iii. Conclusion.
- iv. Implications.
- v. Recommendations.

#### **Overview of Research Problem and Methodology**

The major research problem of the study focused on the motor-skills performance levels between the students with hearing-impairment and those without hearing-impairment using test items selected from the University of Illinois test instruments designed by AAHPERD, 1986 and the SEMU test instruments. The study involved a randomized population of 100 pupils aged between 12 and 18 years, from St. Francis Junior Secondary School and Volta School for the Deaf, both in the Hohoe Municipality in the Volta Region of Ghana. The data for the study were collected on four separate days. Day 1 and 2 were at St. Francis College of Education Park for the students without



hearing-impairment and Day 3 and 4 were at the Hohoe Evangelical Presbyterian Secondary School Park for the students with hearing-impairment. Data obtained from the test of both groups were analyzed using the independent sample t-test to determine whether any significant differences existed.

### **Summary of Findings**

The summary of findings of the study is presented in six main sections according to the six sub-hypotheses. The results revealed that:

1. The hearing-impaired could only compete favourably with the students without hearing-impairment in terms of speed, if flying start for the sprints is adopted. This would enable the hearing-impaired child to process the information fast enough for him or her to react.
2. The findings on balance showed that there was significant difference between the students with hearing-impairment and the students without hearing-impairment. It also showed that the hearing-impaired could not perform balance activities correctly.
3. There was a significant difference between the two groups with regards to power. The independent samples t-test values obtained and interpreted showed that hearing-impaired demonstrated better power. They exhibited power both in the legs and arms.
4. The students with hearing-impairment were not coordinated considering eye-hand coordination but were a little better regarding eye-foot coordination. It may be attributed to the size of the ball. There was no significant difference with one test item and a significant difference with the other.

5. In the stick drop test item for reaction time, the participants had full visualization of the examiner and some information to process. But in the Nelson Choice-Movement, the participants had to look out for the signal before taking a decision on the direction to go and how fast they would move.

6. In agility testing, Illinois Agility run was very cumbersome for the students with hearing-impairment since there were a lot of zigzag moves which had effect on balance but the SEMU Agility run gave them a little relief and they therefore did better than their counterparts as shown by the independent samples t-test values.

## **Conclusions**

It was clear that the hearing-impaired cannot perform better than those without hearing-impairment with regards to running speed except when the flying start is used before hitting the starting point. It was also clear that the hearing-impaired hardly succeeded in balance activities. From the findings, both static and dynamic balance exhibited by the hearing-impaired could be described as very poor. This showed that the damage of the semicircular canals of the inner-ear in most hearing-impaired which creates balance problems may be affecting most of them.

The findings further indicated that the hearing-impaired demonstrated more power in the legs and arms than their counterparts without hearing-impairment. It was also realized in the findings that most of the students with hearing-impairment do mainly activate that develop power. It was clear that since their inability to compete in speed, balance oriented events, they resorted to stationary activities that mainly help to develop power. It was clear from the findings that the hearing-impaired is poor in eye-hand

coordination but quiet good in eye-foot coordination. Again, activities that dealt with eye- hand coordination were minimal among the hearing-impaired but the ability to use the foot seemed more pronounced especially where boys regularly play football. This was reflected in the t-test values obtained which was interpreted to mean that most sporting activities introduced in the schools were more of eye-foot coordination and most of the children participated in them.

The findings also revealed that the hearing-impaired were better off at stick drop test for reaction time. In that test, the participants had a complete view of the instructor who was administering the test. As a result their reaction was very good and better than their colleagues without hearing-impairment. But with the Nelson Choice-Response Movement Test, it was clear that the students with hearing-impairment had to watch for the signal before they react whereas those without hearing-impairment will only need to hear the command and move. It can therefore, be said that, if the hearing-impaired should have the full visualization of the test administrator, they turn to perform better.

Finally, the findings revealed that the hearing-impaired were very poor with the Illinois Agility run. It was clear that since the hearing-impaired was very poor at balancing activities; they were not able to perform all the zigzag runs found in the Illinois Agility run. Contrary to that, they performed better than the non-hearing-impaired in the SEMU Agility run. Since the running in the SEMU involved straighter course, the hearing-impaired did not have so much problems with balance.

With the above presentation, it can be said emphatically that, there was significant difference between the hearing-impaired and those without hearing-impairment regarding their motor skill performance levels.

## **Implications**

The findings of this study have a series of implications for the Ministry of Education, Ghana Education Service and other stakeholders concerned with the total development of the child with hearing-impairment and the disable child as a whole. The Ministries of Education and Youth and Sports in close collaboration with the Ghana Education Service should embark upon a vigorous educational campaign for the teaching of Physical Education in hearing-impairment (Deaf) institutions in Ghana.

Almost, all schools for the Deaf in Ghana lack physical education teachers, sports facilities and equipment which could help to promote physical education among these groups of people. Consequently, if Government, District Assemblies, Non-Governmental Organization and other stakeholders could support the schools for the Deaf by donating money, facilities and equipment, it would go a long way to help develop physical education in their schools and continuous participation will help the hearing-impaired improve upon the problems of balance and coordination and processing of information.

In the same vein, more physical education teachers should be trained in adapted physical education programmes and curriculum in the colleges of education should be restructured so that the general education could handle the hearing-impaired in a physical education class.

## **Recommendations**

Based on the findings of the study and the conclusions drawn, the following recommendations were made:-

1. Flying start should be adopted for short distance (sprint) events.

2. More activities which will help to develop balance should be taught in the schools, for example, walking on a balance beam and standing on one leg.
3. The development of motor skills and knowledge of it must begin in the earliest years of primary school in the special schools.
4. More teachers should be trained in adapted physical education to enhance the training of those with hearing-impairment.
5. Specialized curricular and teaching strategies should be employed in handling the hearing-impaired with regards to physical education and sports.

#### **Recommendations for further research**

From the findings of the study, it is recommended that additional research is conducted on the topic using a larger population involving another age group for example those who have just finished school.

It is also recommended that similar research should be conducted on the following areas:-

- i. Students of the school for the Deaf and private schools for the hearing.
- ii. Only female students of non hearing-impairment schools and Deaf schools.
- iii. Students with impairment of the semi-circular canals and vestibule of the inner ear and non hearing-impairment students.
- iv. Students without semi-circular canals impairment and those without hearing-impairment.

## REFERENCES

- Akuffo, P.B. (1998), Issues in Adapted Physical Education for children with special needs and specific learning disabilities. Unpublished teaching pamphlet, University of Education, Winneba.
- Allport, G. W. (1954). *The nature of prejudice*. Cambridge, MA: Addison-Wesley.
- America Alliance of Health, Physical Education, Recreation and Dance (1986) Test Batteries; Reston, USA.
- Amin, M. E. (2005). *Social Science Research: Conception, Methodology and Analysis*. Kampala, Uganda.
- Amir, Y. (1969). Contact hypothesis in ethnic relations. *Psychological Bulletin*, 71, 319-342
- Auton v. British Columbia (Attorney General), [2004] 3 S.C.R. 657.
- Auxter, D. Pyfer, J. & Huettig, C. (1997), *Principles and Methods of Adapted Physical Education and Recreation*. Dubuque: McGraw Hill Companies.
- Beashel, P., Sibson, A. & Taylor, J. (2001), *The World of sport examined*. Delta Palace, Nelson Thorned Ltd.
- Beashel, P. & Taylor, J. (Eds) (1996), *Advanced studies in Physical Education and sports survey*: Thomas Nelson and Sons Ltd. "CMD Statistics". Archived from the original on 15 December 2007 <http://www.cmdeaf.org/stats/stats.asp>. Retrieved 2007-12-28

- Blinde, M. E. & McCallister, G. S. (1998). Listening to the voices of students with physical disabilities. *Journal of Physical Education, Recreation, and Dance*, 69(6), 64-68.
- Block, M. E. & Vogler, E. W. (1994). Inclusion in regular physical education: The research base. *Journal of Physical Education, Recreation, and Dance*, 65(1), 40-44.
- Bogdan, R. C. & Biklen, S. K. (1994). *Qualitative research for education: An introduction to theory and methods* (2nd ed.). Needham Heights, MA: Allyn and Bacon.
- Colfer, G. (2004, JANUARY 19) The Hauchuca Scout. Newsletter on internet @<http://www.Huachucascout.com>. (Retrieved on May 30, 2005)
- Corbin, C.B. Lindsey, R. & Welk, G. (2000), Concept of Physical Fitness active lifestyle for wellness. Dubuque: McGraw-Hill Companies.
- Corbin, C.B., Lindsey, R. (1994), Concept of Physical Fitness with laboratories. Dubuque: Brown and Benchmark.
- Crowe, W.C., Auxter, D. & Pyfer, J. (1981), Principles and Methods of Adapted Physical Education and Recreation. London: C.V. Mosby Company.
- David, L. H. (2008). Critical Disability Theory; A paper presented at the 4th Biennial Disability Studies Conference at Lancaster University, UK, Sept. 2-4
- Dauer, V.P. & Pengrazi, R.P. (1995), Dynamic Physical Education for elementary school children. New York, Burges Publishing.
- Depauw, Karen P. (1999), Girls and women with disabilities in sport. *The Journal of Physical Education, Recreation and Dance*. Volume 70. Pages 4-7

- Devlin, R. (200). Jurisprudence for judges: Why legal theory matters for social context education. *Queen's Law Journal* 27: 161-205.
- Dick, F.W. (1992), *Sports training principles*, London, A&C Black. Donaldson, J. (1980). Changing attitudes towards handicapped persons: A review of research. *Exceptional Children*, 46, 504-514.
- Dodge, T. & Jaccard, J. (2002). Participation in athletics and female sexual risk behaviour: The evaluation of four causal structures. *Journal of Adolescent Research*, 1742-67.
- Donaldson, J. (1980). Changing attitudes toward handicapped persons; A review of research. *Exceptional Children*, 46, 504-514.
- Eaton v. Brandt County Board of Education, [1997] 1 S.C.R. 241.
- Eldridge v. British Columbia (A.G.), [1997] 3 S.C.R. 624 [Eldridge].
- Flanigan, S.M. (2003, June 24). Deaf students in sport. Oregon, Nugget newspaper @<http://www.nuggetnews.com> (Retrieved on May 30, 2005).
- Gallahue, D.L. (1976). *Motor Development and Movement Experiences for Young Children*. New York: J. Wiley & Sons.
- Gallahue, D.L. (1982). *Understanding Motor Development in Children*. Brisbane: John Wiley & Sons
- Gensemer, R.E (1995), *Physical Education, perspectives, inquiry, applications*. Dubuque, Iowa: Brown and Benchmark.
- Getchell, B. (1993), *Physical Fitness; A Way of Life*. New York: John Wiley & Sons.
- Ghana News Agency (July 13, 2004), Black Wonders appeal for sponsorship [Ghanaweb@ghanahomepage](mailto:Ghanaweb@ghanahomepage). (Retrieved on Jan. 25, 2005)



Ghana News Agency (September 12, 2004), Ghana beat South Africa in Accra: Ghanaweb@ghanahomepage. (Retrieved on Jan. 25, 2005)

Ghana News Agency (November 11, 2004), Black Wonders secure sponsorship package. Ghanaweb@ghanahomepage (Retrieved on Jan. 25, 2005)

Ghana News Agency (Jan. 8, 2005), Ghana failed to shine. Ghanaweb@ghanahomepage. (Retrieved on Jan. 25, 2005)

Ghana News Agency (Jan. 11, 2005), Ghana at Deaflympics Games.

Ghanaweb@ghanahomepage. (Retrieved on Jan. 25, 2005)

Ghana News Agency (April 27, 2005), National Sports Festival for the Deaf open at Wa. Ghanaweb@ghanahomepage. (Retrieved on May 5, 2005)

Ghana News Agency (May 1, 2005) National Sports Festival for the Deaf ends at Wa. Ghanaweb@ghanahomepage. (Retrieved on May 5, 2005)

Godsiffs, K. (2003, June 24), Deaf students excel on bikes and skis. Oregon, Nugget Newspaper @<http://www.nuggetnews.com>. (Retrieved on May 30, 2005)

Goodwin, D. L. (2001). The meaning of help in PE: Perceptions of students with physical disabilities. *Adapted Physical Activity Quarterly*, 18, 289-303.

Goodwin D. L. & Watkinson, E. J. (2000). Inclusive physical education from the perspective of students with physical disabilities. *Adapted Physical Activity*, 17, 144-160.

Graham, C.K. (1971). The history of Education in Ghana. London: (Frank Cass & Co. Ltd)

Granovsky v. Canada (Minister of Employment and Immigration), [2000] 1 S.C.R. 703 [Granovsky].

- Graphic Sports (2004, June 8, p.4-5), Accra. Graphic Group of Companies.
- Groves, L. (1989), *Physical Education for handicapped children*. London: Cambridge University Press
- Hannon, C., Cradock, A., Gortmaker, S., Wiecha, J., Ayadi, A., Keefe, L., Finkelstein, D., Fitzgerald, K. & Sobel, A. (2002). *Play across Boston: Summary report*. Harvard School of Public Health.
- Heiman, G. W., (2002). *Research Methods in Psychology*. 3rd Edition. Boston & New York. Houghton Mifflin Company.
- Hodge, S. R., Ammah, J. O. A., Casebolt, K., LaMaster, K. & O'Sullivan, M. (2000). *Analysis of inclusion practice in physical education*. Unpublished observational behavioural instrument. The Ohio State University, Columbus, OH
- Horkheimer, M (1972) (ed) *Critical Theory: Selected Essays* (Herder and Herder, Toronto 1972).
- IFC Policy Briefing, (2011), 2011-2012 Policy Briefing Document, available from: [http://incfit.org/files/IFC%20Policy%20Briefing%202011\\_2012.pdf](http://incfit.org/files/IFC%20Policy%20Briefing%202011_2012.pdf)
- Jamie B. Jami (2005), *Your Guide to Deafness*. Newsletter on the Internet Jamie @<http://www.clerccenter.gaullaudet.edu>. (Retrieved on May 30, 2005)
- Kabeer, N. (2002). *Citizenship and the boundaries of the acknowledged community: Identity, and exclusion*. Working Paper 171, Institute of Development Studies, Brighton.
- Kannus, P. (1999). Preventing osteoporosis, falls, and fractures among elderly people. *British Medical Journal*, 318:205-206
- Kosinki, R.J. (2005), *Reaction Time*. Newsletter on the internet @<http://biology>.

Clemson.edu. (Retrieved on May 30, 2005)

Kunesh, M. A., Hasbrook, C. A. & Lewthwaite, R. (1992). Physical activity socialization:

Peer interactions and affective responses among a sample of sixth grade girls.

*Sociology of Sport Journal*, 9, 385-396

Lieberman, L.J. (1999), Sports is life. Newsletter on the internet

@<http://www.clercenter.gallaudet.edu>. (Retrieved on May 30, 2005)

Lepofsky, D. (2004). The long arduous road to a barrier-free Ontario for people with

disabilities: The history of the Ontarians with Disabilities Act – The first chapter.

*National Journal of Constitutional Law* 15: 125-333.

Mackenzie, B. (2004, July 1), Successful Coaching. Newsletter on the internet

@<http://www.successfulcoaching.com>. (Retrieved on May, 2005)

MacKinnon, C. (1989). *Toward a feminist theory of the state*. Cambridge, MA: Harvard

University Press.

Magrab, P. (2002). Mapping of Donor Assistance by Country. In *An International*

*Strategy to Put the Dakar Framework for Action on Education for All into*

*Operation* (pp.4044). Paris, France: UNESCO

Magrab, P. (2002). *EFA Donor and International Organization Assistance: Multilateral*

*Donors, Bilateral Donors, and Non-Governmental Organizations*. Paris, France:

UNESCO.

McWilliam, H.O.A & Kwamena-Poh, M.A. (1978), *The development of education in*

*Ghana*. Hong Kong, Commonwealth Printing Press Ltd.

Michalko, Rod. (2002). *The difference that disability makes*. Philadelphia: Temple

University Press.

- Microsoft Encarta Encyclopedia, (2004), (Retrieved on Jan. 24, 2005)
- Minda, G. (1995). Postmodern legal movements: Law and jurisprudence at century's end. New York: New York University Press.
- Minow, M. (1990). Making all the difference: Inclusion and exclusion in American law. Ithaca, NY: Cornell University Press.
- Missionary Biographical Sketch of Andrew Jackson Foster
- National Black Deaf Advocates-Andrew Foster Scholarship
- Patton, M. Q. (1996). *Utilization-focused evaluation* (3rd ed.). Thousand Oaks, CA: Sage.
- Place, K. & Hodge, S. R. (2001). Social inclusion of students with physical disabilities in general physical education: A behavioural analysis. *Adapted Physical Activity Quarterly*, 18, 389-404.
- Plessy v. Ferguson, 163 U.S. 537 (U.S.S.C., 1896).
- Pinchas, P.R. (2004), CISS eNews @<http://www.deaflympics.co>
- Prentice, W.E. (1999), *Fitness and wellness for life*. Dubuque, Iowa: McGraw-Hill Companies Inc.
- Prentice, W. (1994), *Fitness for college and life*. St. Louis: Mosby.
- Rawls, J. (1999). *A theory of justice*. Rev. ed. Cambridge, MA: Belknap Press of Harvard University Press.
- R. v. Parrott, [2001] 1 S.C.R. 178.
- Richman, E. L. & Shaffer, D. R. (2000). „If you let me play sport“: How might sport Participation influences the self-esteem of adolescent females? *Psychology of Women Quarterly*, 24:189-199.

- Sabo, D., Melnick, M. & Vanfossen, B. (1989). *The Women's Sports Foundation report: Minorities in sports*. New York: Women's Sports Foundation.
- Sanders A.F. (1998), *Elements of human performance: Reaction processes and attention in human skill*. Mahwah, New Jersey. Lawrence Erlbaum Associates
- Sherrill, C., Heikinaro-Johansson, P. M. & Slininger, D. (1994). Equal-status relationships in the gym. *Journal of Physical Education, Recreation and Dance*, 65(1), 27-31, 56
- Sherrill, C. (1993). *Adapted physical activity, recreation and sport-cross disciplinary and lifespan*. Dubuque, Iowa: Brown Benchmark.
- Siedentop, D. (2001), *Introduction to Physical Education, fitness and sport California*: Mayfield Publishing Company. *Statistics of Christian Ministry for the Deaf*
- Slininger, D., Sherrill C. & Jankowski, C. M. (2000). Children's attitudes toward classmates with severe disabilities: Revisiting contact theory. *Adapted Physical Activity Quarterly*, 17, 176-196.
- Strassler, B. (1999), *Deaf Jews in sports*. Newsletter on internet  
@<http://www.clercenter.gallaudet.edu>. (Retrieved on June 7, 2005)
- Strassler, B. (1999, Sept. October), *World around you*: Newsletter on internet  
@<http://www.clercenter.gallaudet.edu>. (Retrieved on June 7, 2005)
- Titchkosky . T (2003). *Disability, Self, and Society* (University of Toronto Press, Toronto) at 162.
- Titchkosky, T. ( 2001). Disability: A rose by any other name? "People first" language in Canadian society. *Canadian Review of Sociology and Anthropology* 38, 2:125-40.
- UNESCO Charter of Physical Education and Sport (Paris: UNESCO, 1978)

<http://www.unesco.org/education/nfsunesco/pdf/SPORT E.PDF>. (Retrieved November 22, 2011)

U.S. Department of Health and Human Services (1996), *Physical activity and health: A report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services Centres for Disease Control and Prevention, National Centre for Chronic Disease Prevention and Health Promotion.

Vogler, W. E., Koranda, P. & Romance, T. (2000). Including a child with severe cerebral palsy in physical education: A case study. *Adapted Physical Activity Quarterly*, 17(2), 161-175.

Welford, A.T. (1980), *Choice Reaction Time: Basic Concepts* New York Academic Press.

Winnick, J.P. (1995), *Adapted Physical Education and Sport*. Brockport: Edward Brothers Inc.

**APPENDICES**

**APPENDIX A**

University of Education, Winneba

HPERS Department

P.O. Box, 25

Winneba

The Headmaster,

Volta School for the Deaf

Hohoe, V / R

Dear Sir/Madam,

**PERMISSION TO CONDUCT RESEARCH IN YOUR SCHOOL**

I am an M.Phil student of the University of Education, Winneba, in the Health, Physical Education, Recreation and Sports department and wish to conduct a test on some of your students to enable me compare their performance to that of their counterparts in St. Francis Junior Secondary School students.

I count on your cooperation.

Thank you

Yours faithfully,

.....

Michael Ahorlu.

**APPENDIX B**

University of Education, Winneba  
HPERS Department  
P.O. Box, 25  
Winneba

The Headmaster,

St. Francis JHS

Hohoe, V / R

Dear Madam/Sir,

PERMISSION TO CONDUCT RESEARCH IN YOUR SCHOOL

I am an M.Phil student of the University of Education, Winneba in the Health, Physical Education, Recreation and Sports department and wish to conduct a test on some of your students to enable me compare their performance to that of the hearing-impaired students of Volta School for the Deaf.

I count on your cooperation.

Thank you.

Yours faithfully,

.....

Michael Ahorlu.