UNIVERSITY OF ILORIN

THE TWO HUNDRED AND NINTH (209TH)
INAUGURAL LECTURE

MOVEMENT MECHANICS: PERFORMANCE INTERLOCK OF TRAUMA, MORTALITY AND WELLNESS

BY

PROFESSOR OLUFUNMILOLA LEAH DOMINIC
N.C.E. (ILESA), B.Sc. Ed., M. Ed. (ILORIN) Ph. D. (A.B.U.)
DEPARTMENT OF HUMAN KINETICS EDUCATION,
FACULTY OF EDUCATION, UNIVERSITY OF ILORIN,
ILORIN, NIGERIA

THURSDAY, 18TH NOVEMBER, 2021

This 209th Inaugural Lecture was delivered under the Chairmanship of:

The Vice Chancellor

Professor Sulyman Age Abdulkareem
BChE, MChE (Detroit), PhD, ChE (Louisville), FCSN,
COREN R. Engr. (ChE)

18th November, 2021

ISBN: 978-978-57721-5-9

Published by

The Library and Publications Committee
University of Ilorin, Ilorin, Nigeria

Printed by
Unilorin Press
Ilorin. Nigeria

PROFESSOR OLUFUNMILOLA LEAH DOMINIC
B.Sc. Ed. M. Ed. (ILORIN) Ph. D. (A.B.U.)
PROFESSOR OF EXERCISE AND SPORTS SCIENCE
DEPARTMENT OF HUMAN KINETICS EDUCATION,
FACULTY OF EDUCATION, UNIVERSITY OF ILORIN,
ILORIN, NIGERIA

BLANK

Courtesies
The Vice-Chancellor,
Deputy Vice-Chancellor (Academic),
Deputy Vice-Chancellor (Management Services),
Deputy Vice-Chancellor (Research, Technology and Innovations),
Members of the University Governing Council,
The Registrar,
The Bursar,
The University Librarian,
The Provost, College of Health Sciences,
The Dean, Faculty of Education,
Dean of other Faculties, Postgraduate School and Student Affairs,
Directors of Various Units,
Professors and other members of Senate,
Head of various Departments, especially the Head of Department of Human Kinetics Education,
Members of Staff (Academic and non-academic), in particular those of the Faculty of Education, University of Ilorin Sports Unit and Department of Human Kinetics,
My lords Spiritual and Temporal,
Students of the Better By Far University, in particular, students of Faculty of Education and Department of Human Kinetics Education
Members of my Family, Nuclear and Extended,
Gentlemen/Women of the Prints and Electronic Media,
Distinguished Ladies and Gentlemen

PAST INAUGURAL LECTURES IN THE DEPARTMENT

1.	Professor Monsuru Lasun Emiola	Thursday 26th June, 2008	All Work and All Play: The Health Assurance in Exercise
2.	Professor Adetayo Ebun Talabi	Thursday 21st January, 2016	Heaven is Far: Only the Fit Can Make it

And today's Inaugural Lecture is titled ''**Movement Mechanics: Performance Interlock of Trauma, Mortality and Wellness''**

Preamble

Faithful is He that calleth you and who also will do it (1Thessalonian 5:24) and He has done it! Today is a significant day of my life - the fulfilment of God's promises to take me from mere clay to sit with princes and princesses. To God be the glory because He is alive, He remains God whether people acknowledge Him or not. Jesus is the same yesterday, today, and forever. I return all the glory to Him for everything that is named with my life.

Mr. Vice Chancellor sir, kindly permit me to sing this song.

Moyin Oologooo 2x
Ibite simi deee,
Memo pe mole debeoooo
Mo yin Oologooo. (twice)

Mr. Vice Chancellor Sir, today started from a childhood dream of becoming a Medical Doctor when at age three in Kumasi, Ashanti New Town, my father took me to the General Hospital due to an injury sustained and the Medical Doctor, a white man wearing a sparkling Lab Coat, treated me with all care and that day gave me the vision to run with 'Baaami, maakawe, maa di dokita, maa tojurin ati moomi' (My father, I will study to become a medical doctor and take care of you and my mum

(Late Pa Samuel Ogunsanya and Mrs. Felicia OmorinolaFabinu). This became a lifetime dream. 'All foreigners especially Nigerians must go' of Busia in 1968 brought us back to Nigeria thinking the dream was gone. My encounter with my Aunt, (Late Chief Mrs. Lydia Kayode-Ojo) at Christmas of 1969 reactivated the dream when her spoken English enticed me to follow her to the North, specifically, Niger State where I continued my primary education. The fear of sending a village girl to Lagos made me lose admission to Queens' College Lagos but fortunately, I got admission to Women Teachers College, Minna in Niger state to pursue 5-year Teacher Education Programme conducted by WAEC between 1974 and 1979. The dream to become a Medical doctor spurred me on to attain the best student from Form 1 to Form 5,taking the 2nd position only once.

The journey to study Physical Education started with the transfer of our General Science and Health Science teachers at the 3rd term of Form Four with no replacement. We were all forced not to register for the subject in order not to fail it, thus killing my dream of becoming a Medical doctor. After the WASSCE examinations in which I had four As and Four Bs among which PE was one. I found out about all the areas and as a Teacher Grade Two graduate, the closest course to promoting health and performance to me was Physical Education, hence this laid the foundation of my career to this day.

The interest to go back to school for promotion was hindered again and again due to always receiving the interview letter a week late until 1992 when I had become a Senior Basketball Coach in Niger State Sports Council. God remains faithful. I realized dreams and vision never die unless the carrier of the vision and dream has. My beloved husband kept motivating me to take a step towards pursuing my dream. This brought me back to school after the Academic Staff Strike of 1992-1993 as a Direct Entry Student, with eight months old twins. I give God the glory for clinching the Best Graduating Student of Physical Education in the Department. My lecturers'

encouragement and my husband's support helped me attain my Master degree in Exercise Physiology in 1999.

My Academic Journey

Mr. Vice Chancellor Sir, my academic journey started on the 3rd June, 2002 as an Assistant Lecturer and I became a Professor of Exercise and Sports Science in 2018.My academic research started with a bias for my sport, basketball. Later, I became interested in health and performance especially in relation to body proportionality and wellness through physical movement. This led to my Ph. D. in Exercise and Sport Science with a thesis in movement mechanics titled "Kinematic Analysis of Arm Motion During Jump Shot in Nigerian Female Basket ballers", to determine the shooting techniques and physical characteristics of elite female players compared to professional international players.

To address the lecture of today, definition/clarification of salient concepts are essential for my audience to have an in-depth understanding of the discourse. These clarifications might positively change the perceptions among the academics, non-teaching staff, parents, students and community leaders to embrace a holistic approach to movement behaviour integration into daily living and community health promotion. I will start with the Key Words in the title.

MOVEMENT MECHANICS

Your Body is a Machine that should not Be Parked

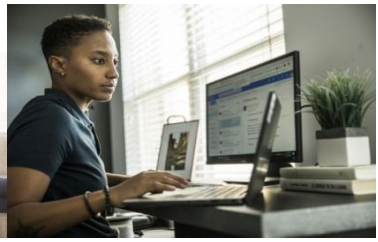

Fig. 1: Pictorial Depiction of Human-Machine Distinction

The human body, as a machine is a complex system of many interconnected and interacting parts. It is a multifaceted natural machine designed for movement, dynamic survival functions, realization of full potential and fulfilled life when it is not parked like an automobile through sedentariness or disease. Any form of breakdown in the body requires immediate repair to prevent further damage to its durability and sustainability. The human body is a wonderful machine that performs multidimensional functions without resting from birth and stops only in death or death of a body part such as stroke and paralysis (Soda, 2017).

Just like automobiles, the human body's performance may become clumsy or breakdown when its maintenance is neglected or compromised (fitness, wellness, and health) or given inferior fuel (nutrition). Unlike automobiles, our bodies cannot be replaced in case of permanent damage or wear and tear. Machines have discrete parts with specific functions connected in straightforward ways whereas the human-machine parts may have blurry boundaries, often connected in ways too hard to understand; withmany functions (Nesse, 2016; Livni, 2017).

The body is an instrument for expression of the inner state of the mind by which an individual could be described. Except with the use of high microscopic instruments, only the human body can be observed, touched, or used for all human activities either consciously or subconsciously as dictated by the soul (brain, sensory and motor nerves, hormones). The level of body use determines most times, the freedom of expression,

participation or movement (capacities and capabilities). The body is terminal (decays when not used) determining the levels of one's strength, resilience and life expectancy. The human body machine is the most valuable gift of God that requires continuous, purposeful, subconscious and conscious movement that is commensurate with the fuel necessary for its optimal performance in all life functions.

Origin of Movement

Movement originated from the creation account in Genesis, chapter two verse seven: *And the Lord God formed the man from the dust of the earth (ground) and breathed into his nostrils, the breath of life and the man became a living soul.* Immediately breath came into man, life came into him to move. God then created the environment (Garden of Eden) for man to have space to move (Genesis 2:8-18). The functionality of the *soul and body*, therefore, depends on the continuous supply of breath to continually be a "living soul". Man's sustainability of soul and spirit depends on continuous movement.

Verse 11: "And the Lord God took the man and put him in the Garden of Eden "To work in it and take care of it"

Genesis chapter two verse eleven established that man was designed even when to be immortal before the "fall" to work and take care of the garden" to ensure the body is used. Hence, "Movement", is important for man's survival and tranquility. Therefore according to Aristotle, 'Movement is Life - Life is Movement'. The less the movement, the more the exposure of the body to injury, morbidity and mortality risks. Movement is the power for growth and development for healthy living and a sustainable healthy lifestyle (Dominic & Adu, 2018). Only through movement are actions demonstrated.

Concept of Movement

The word 'Movement' in this lecture is described as '*physical activity behaviour, including all household chores, work-related movement, plays, recreational activities and exercise, sports, religion, danceand all individualized based movement.* Human movement is beyond geometric description and encompasses locomotion and non-locomotion.

Movement is a term used by almost all but not in relation to exercise and physical activity and not defined from physiological dimensions (Bowman, 2017). Mechanically, movement was defined as work while geometrically, it is defined as a change of place or position from a reference point. Bowman (2017) expressed his belief and propose that in addition to the general idea of a body changing its position in space, movement should be additionally defined as "any motion that creates a change in the shape of a body or parts of a body" - and need not be bound to an intention or caloric expenditure or limited to physical fitness variables.

Movement is an integral part of every function and process within the body, with bodies, and/or the environment. The human body moves in diverse ways and directions. Natural body movements include walking, running, bending, landing, jumping crawling, carrying and reaching. The human body can move and be moved in numerous ways beyond those that utilize skeletal muscle or contribute to physical fitness performance, yet it could relate to various health outcomes. For instance, yawning that causes goose pimples moves the body entirely but is neither related to physical fitness nor therapy.

The concept of movement in this lecture, therefore, connotes all types of human motion, functional tasks, physical activity and exercise. Merkel et al. (2020) argued that movement should include global physical activity, individualized exercise programmes, specific motor learning, and functional tasks which are often prescribed to reduce pain, restore as well as improve function. This makes movement not just a mechanical connotation but encompassing physiological, biological,

psychological, sociological and biomechanical dimensions. Natural movements allow babies and children to develop initial bone and muscle strength while maintaining and improving function from adolescence onwards. A new definition of movement should, therefore, recognise physical activity and exercise as related subcategories of movement.

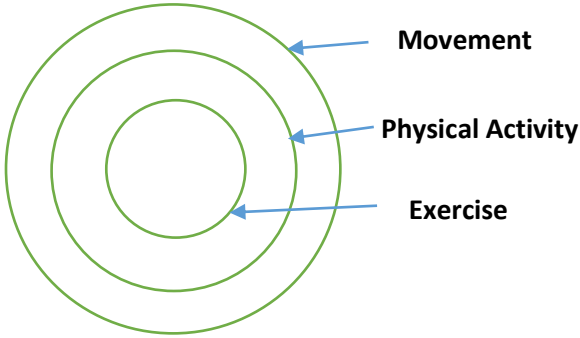

Fig. 2: Segments of Movement

The Dichotomy of Movement, Physical Activity, Exercise and Prescription

Physical Activity (PA) refers to all movements involving large muscles of the body that increase energy expenditure by utilizing calories. For example, activities of daily living (such as shopping, gardening, housekeeping, child-rearing), riding a bicycle for transportation, sport or exercise and work-related activities. Physical Activity may be non-exercise (as in carrying out one's daily activity) or exercise-based (done purposively planned, structured and repetitively to improve one's health, physical fitness indices or performance). Setting objectives or goals for doing Physical Activity makes it become 'Exercise'. Physical Activity could therefore be defined as both non-exercise and exercise physical activities which use vigorous body

movements that result in energy expenditure. All exercises are Physical Activities but not all Physical Activities are exercise.

Exercise, therefore, is a subset of Physical Activity (PA) that is performed based on specific objective(s). Exercise results in acute and chronic responses and adaptations depending on time (duration), type of exercise (aerobic, strength, flexibility, etc.),intensity(how hard) and frequency (repetition). Exercise sets to improve attributes of physical fitness - a set of attributes measurable to assess health or performance (Bowman, 2017).Sport could be classified as either exercise Physical Activity or exercise for optimising performance. Sport is a purposive activity involving physical skill and exertion, governed by a set of rules or customs, and undertaken competitively and capable of achieving a result. It is more of exercise.

What delineates movement from exercise and Physical Activity is the motive attached to such movement. Movement, in its "natural state," is a reflex action, most of which are performed as either locomotive or non-locomotive actions such as yawning, stretching from a sitting position (flexibility), clapping or dancing (joyful repetitive motion), or repetitive neck rotation when stressed. These are non-exercise reflex movements that might be beneficial to health and overall wellness. It might be informal, formal and purposive for all situations. The effects and benefits of movement are not limited to caloric expenditure and physical fitness only but also facilitate operations in almost every human system (e.g. immune, digestive, nervous, etc.).

The ability of the body to function effectively and efficiently by carrying out tasks or activities (sports, occupation and daily activities) without undue fatigue and still have energy reserves for emergencies refers to *Physical Fitness (PF)*. Thus, Physical Fitness is measurable and useful in determining the effect of Physical Activity, exercise and movement. PF has two-way dimensions –*"General fitness"* is a state of health and wellbeing while "*Specific fitness*" is a task-oriented definition based on the ability to perform specific aspects of sports or

occupations improving specific components. For example, improving elderly gaits through balance and agility components of PF. Good or healthy body movement is associated with a person's ability to work effectively, enjoy leisure time, be healthy, resist hypokinetic diseases, and meet emergencies without undue fatigue holistically.

From the submission of Bowman (2017), with the encompassing definition of movement, mere prescription of exercise may not be adequate unless there is the understanding that movement relates to other non-fitness outcomes in the body. For example, those without access to exercise experts and facilities will only benefit from encompassing movement.

> *We are in a cultural setting where the use of cars, robotic vacuums, hired landscapers, supermarkets, and pre-grown, packaged, and cooked food is chemically prepared; most of the responsibilities we hold (work, family, hobbies) have become movement-free, or consist only of a narrow range of repetitive motions performed during work hours only. Our lifestyle has resulted in us and the parts of our bodies being almost entirely sedentary (Bowman, 2017).*

Another factor that makes movement study holistic is that it considers nutritional mismatch where a greater intake of calories is than the expenditure leads to movement famine. The impact of movement famine on health and mortality calls on all of us (even the lecturer of today) to purposively rise to move more and more, ensuring the involvement of all body parts at all times giving the human capacity for movement to cover every minute of the day as long as there is breath in us. Movement techniques adaptation has infinite geometrical possibilities and it is greater than daily workouts, athletic exercise and training dynamics. This calls upon human movement scientists to broaden the scope of their researches and make it evolving and collaborative for individual and communal wellbeing. Bowman submitted that the application of researches in human movement extends beyond

physical fitness variables and includes variables of biological fitness.

Channels of Movement

Channels of human movement are either informal or formal. Informal movements are activities of daily living that are not predetermined and prescribed to achieve specific fitness or wellness goal. They are movement behaviours found within the daily engagements which might include play, household chores or domestic work, movement related to one's vocation or occupation and religious moves and postures. Formal movement have targets or goals set to be achieved for health, fitness, wellness or performance.

Play as Informal Movement

The word "Play" is derived from an old English term "Plegan",which means "to dance, to leap for joy, to rejoice, and to be glad"(Online Oxford Dictionary, 2021). However, the old English term "Plega" or "Plegian" denotes "to exercise", "brisk movement'' describes play as formal. These definitions showed that play can be an informal or formal channel of movement.

Play describes 'activity of children or to be childlike', 'lightness of behaviour in adults' 'displaying the purest and most spiritual activity of man' thereby promoting psychological and emotional health/wellness while improving the body subconsciously. Play provides an outlet for the discharge of surplus energy and acts as a safety valve to keep the normal balance of the individual's energy.

Play is a non-serious suspension of consequence, a temporary creation that is often a shadow of the "real world". For example, hanging a rim in your compound, creating a small court or field to play basketball or volleyball across a rope; creating a goalpost to play soccer; sitting in your sitting room with your child and throwing/rolling a ball to each other are all forms of informal movement beneficial for sustaining life.Play is expressively and intrinsically motivated (Emiola, 2008). Play is

mostly unplanned, with no rigid rules attached and mostly spontaneously aroused and participated in.

Fig. 3: **Play Movements**

Household Chores Movement

"Chores simply means, the regular or daily light work of a household or farm; a routine task or job" (Merriam Webster Dictionary, 2021). A household refers to a family or group of people living together under the same roof (Askinglot.com, 2021). Household chores include tasks such as cleaning, washing and ironing that have to be done regularly at home (Collins Dictionary, 2021) which help kids learn responsibility and self-reliance. Starfish Therapies tagged household chores as 'Chores for Movement' (Menz, 2021). Vogel (2021) who titled her article "Chore Training": How to move and have a really clean house", explained that chores are an opportunity for adequate multi-complex movements for optimal health. Some of the household chores which provide adequate movement were listed as sweeping, vacuuming, washing dishes, feeding pets and other animals/birds, preparing meals, pounding yam with mortar; grinding pepper with a grinding stone and so on. According to

Gleaner (2019), doing chores around the house does not only burn calories and build muscles but are also a very good medium for cardiovascular or strength training exercises under good ambience.

In Men's Journal (2021), ten household chores with specific benefits on men's health and fitness were highlighted. Painting subsumes rotational movement, overhead press, squatting and stretching. Car washing strengthens the stabilizing muscles of the shoulders and promotes rotational movement that opens up the shoulders which tend to hunch over and round from several hours of computer and smartphone use. Others include raking leaves, tree pruning and cutting, mulching, treeding, cleaning the garage, fence removal among others.

For those who feel busy occupational schedules prevents them from exercising, doing housework is an opportunity to effectively participate in physical activity with the same reward as going to the gym. Thirty minutes of vacuuming or sweeping the floor can burn up to 130 calories. Although this is less than cycling on a bike (stationary) for the same amount of time, which can burn nearly 400 calories (Aganwal, 2018). Despite household chores might not meet the 150 – 300 minutes per week physical activity required for health and fitness, it is, however, better than not doing any physical activity.

Household Chores and Movement Health

Adults between 18-64 years are expected to do at least 150 – 300 minutes of moderate-intensity aerobic PA every week which approximately translates to 30 – 43 minutes in a day (WHO, 2020). Although the listed household chores might be strenuous, but estimates show that they cannot completely replace "running", "brisk walking" or "cycling". Research has also shown that though domestic PA accounted for over 35% of the moderate-to-vigorous intensity PA recommendations, it did not have any effect on leanness or weight loss. However, involvement in household work is beneficial for health

maintenance and wellness because it helps to reduce overall daily sedentariness (Agarwal, 2018).

Involving children in household chores helps them to learn important life skills and feel good about contributing to family life by experiencing relationship skills like communicating early, negotiating, cooperating and working as a team with family members. Not solely relying on houseboys/maids for house chores can strengthen family relationships, reduce stress and the gap between children and parents (Australian parenting website, 2020).It also reduces laziness, suicide thoughts, low self-esteem and the influence of negative peer groups.

Fig. 4: Household Chores Movement

Occupational (Work-Related) Movement

Occupational movement encompasses all physical activity in one's job or career. Occupational movement is delineated by daily labour to earn a living. It takes different forms such as standing for long hours as a field executive,

soldier, policeman or traffic warden. Other involve performing light-to-moderate lifting or doing manual labour on a construction site. Occupational movement otherwise called Occupational Physical Activity (OPA) more often meets the definition of hard labour rather than leisure-time physical activity (LTPA) at home or the gym. Generally, those fully employed individuals spend a large proportion of their day at work (Tudor-Locke et al., 2011), those in highly active occupations may accrue substantial amounts of qualifying physical activity through their job alone (Steeves et al., 2015). Few studies have examined the contribution of OPA to physical activity levels in Nigeria.

Technological and urban transitions over time have changed the movement lifestyle of many occupations. A 2011 systematic review of ten studies found that individuals with *higher-status occupations, that is, white-collar/non-manual labour had lower total physical activity compared to individuals with lower-status jobs (blue-collar/manual labour)* (Kirk et al., 2011). Manual workers were found to be more likely to meet total physical activity guidelines measured as 10,000 steps per day, but these associations varied by gender. A key limitation noted by the authors was the heterogeneity in the measurement of occupation status/category between the studies. Depending on the cultural settings, occupational movement promotes selective physical fitness informing the need for whole-body movement for total wellness and health.

Fig. 5: Occupational Movements

Contributions to Occupational Physical Activity

Our study on the influence of occupational PA on anthropometric profile and body composition of bricklayers in Kwara State, Nigeria delineated bricklaying as high intensity/moderately high-intensity occupational PA (Dominic et al., 2018). The demonstrated significant effect was in bicep circumference and chest circumference proportionality/ musculature. As occupational movement increased body fat accumulation and obesity risk and/or related diseases decreased. Thus, an occupational movement (with high METs 2,699.1) has health and fitness benefits on body composition, upper body adaptation (bicep and chest), strength and resistance to fatigue which are required for optimal occupational performance. Involvement in exercise will therefore consolidate and prevent selective ailments.

Religious Movement

Religion rituals are sources of movements within diverse modes of worship. Prayer and worship postures have been observed to be beneficial to fitness and wellness (Kamran, 2018). For example, Ṣalāt (Muslim prayer) involves continuous gentle muscle contraction and relaxation with perfect harmony and balance. Different types of stretching and isometric contraction exercises involved in religious rituals include standing, sitting, twisting and flexing the trunk and the limbs as well. Public health awareness is crucial to gain maximum physical health benefits associated with prayer postures in almost

all religions (Kamran, 2018). The Christians' clapping, prayer, praise walk and kneeling are beneficial for aerobic fitness, flexibility thereby alleviating pains and reducing physical inactivity. There is the need for people of different faiths to consciously participate in religious PA for multidimensional benefits.

Fig. 6: Religious Movement

Formal Movement

Formal movements are professionally-designed programmes to achieve health or performance enhancement such as in Physical Education practical classes, sports, exercise and dance. Examples include resistance exercise to develop muscle strength and improve bone density, aerobic workouts to boost cardiorespiratory fitness among others.

Physical Education and Sports

"Physical Education" and "Sports" are misconstrued as synonymous terms. Physical Education is an academic discipline which deals with the development of an individual physically, mentally, socially, spiritually, psychology among others through

physical activities. Adeyanju (2017) expressed Physical Education as part of the educational process that is carried out through physical activities and movements specifically designed to acquire motor skills, cognitive development, interpersonal relations, socio-emotional attitude, physical fitness, appreciation of values and active living for the overall development of an individual. The goal of Physical Education in school curriculum is to prepare students to live physically active, healthy lives through carefully planned scope and sequence of learning experiences.

Sports, on the other hand, connote physical activities that involve skill development, rules, regulations and customs guiding its involvement. It has a competitive inclined pursuit of winning with incentives attached. Salami (2000) as reported by Dominic (2006) explained that sports are used to illustrate physical education in schools and act to functionalise learning and its experiences by which sports practice is promoted. This implies that through physical education classes, students build skills for plays and games which might eventually lead to sports pursuits in life or friendly competitiveness for optimal career performance.

Fig. 7: Physical Education Practical Classes, Dance Class, and Sports

Physical Literacy and Movement for Life

Several definitions of the concept of physical literacy emphasise an individual's responsibility to be physically active if lifelong wellbeing is to be maintained. Physical Literacy is the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activity for life (Whitehead, 2016; International Association of Physical Literacy, 2017).Australian Sports Commission (2019) viewed physical literacy as lifelong holistic learning acquired and applied in movement and physical activity contexts which reflects ongoing changes integrating physical, psychological, cognitive and social capabilities which are vital in helping us lead healthy and fulfilling lives. Physical literacy is a journey we are all undertaking consciously or subconsciously from birth to death. The more we play, the more we explore the world around us, the more the movement we experience. Everyone has the potential to value, develop and maintain

positive physical activity behaviour for lifelong wellbeing. However, many people consider it *a waste of time.*

Due to its numerous opportunities in multiple environments, benefits to healthy development of the whole person, Physical Literacy was recognized as one of the major goals of Physical Education in 2014 by the Society of Health and Physical Educators (SHAPE) (National Standards and Grade level outcomes for K-12 Physical Education [NASPE], 2019). It is expected that the physically literate individual demonstrates competency in a variety of motor skills and movement patterns and can apply the knowledge of concepts, principles, strategies and tactics related to movement and performance. Furthermore, the physically literate individual should also be able to demonstrate acquired skills and knowledge to achieve and maintain a health-enhancing level of physical activity and fitness; exhibit responsible personal and social behaviour that respects self and others; and recognize the value of physical activity for health, enjoyment, self-expression and/or social interaction (SHAPE National PE Standards, 2019). Thus, Physical Literacy could only be accomplished by formulating and implementing a policy that integrates 20-30minutes of PE lessons at all levels of education. This will help reduce or eliminate mortality associated with physical inactivity; hence, improving productivity among the populace.

Basic movement literacy skills include the ability to plan and execute basic motor skills such as walking, running, jumping, catching, hopping, kicking, and throwing with agility, balance and coordination using correct movement mechanics (technique) to prevent postural deviation from childhood through adulthood (Canadian Sports Centres, 2011; Loitz, 2013). These skills could be adopted/adapted to suit the environment either in school settings or at home where standardized facilities and equipment are not available or inadequate.

Whitehead (2016) describes a physically literate individual as an individual who undertakes a personal journey in physical movement, having the understanding to value and take

responsibility for maintaining purposeful physical pursuits throughout the life course. Being physically literate enhances physical fitness, improves motivation and self-confidence to be physically active, boosts understanding of different movement patterns and duration, leads to active and fulfilling life through regular physical activity (Australian Sports Commission, 2019).Physical literacy is required to enjoy the benefits of physical activity and its contributions towards the development and maintenance of health such as delaying ageing and preventing cardio-metabolic diseases. Hence, 'the physically illiterate' is not motivated and lacks confidence, knowledge and understanding to value and take responsibility for maintaining purposeful physical pursuits that span a lifetime.

The experience of physical and mobility impairments such as bone/joint and muscle pains, injuries and other medical conditions at any stage of adulthood can be delayed or even averted with adequate physical literacy. These are dependent on neurological networks and muscular structures that guide movement and coordination (Canadian Sports Centre, 2011). Therefore, developing and maintaining physical literacy throughout a lifetime will help us as individuals to participate in physical activities and to obtain associated benefits.


Fig. 8: Physical Literacy Classes

Study of Human Movement and Movement Science

Mr. Vice Chancellor Sir, movement is essential to man in multidimensional areas. This led to concepts such as Kinesiology (the study of human movement in all ramifications),

Human Kinetics (the study of human movement and performance) and other terminologies.

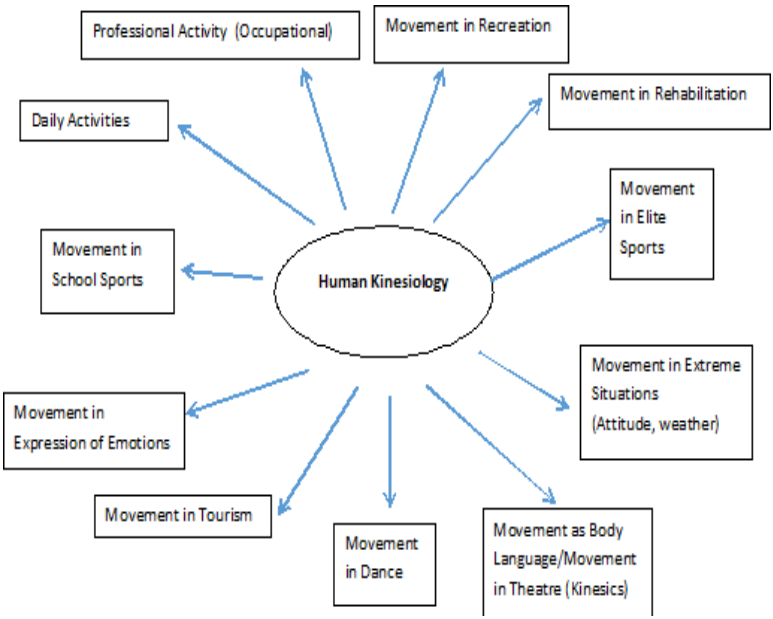

Fig. 9: Movement in Daily Activities (Adopted from Startosta, 2001)

Fig. 9 shows some areas of specialisation in movement studies dichotomised from different professional angles. The term 'Physical Education (PE) is revisited because the science of movement had led to several name changes a long time ago. Terms like 'Human Movement', 'Kinesiology', Biokinetics, 'Exercise and Sports Science', among others were proposed (Thomas & Nelson 1990). In Nigeria, Physical Education and Health Education has been split in most tertiary institutions with PE changed to Human Kinetics (an aspect of mechanics - still limited in scope). Kinetics, a branch of mechanics in Physics, studies forces causing motion. A revisit of this name fora more

encompassing holistic curriculum review, attractive career prospects that meet industrial and societal demands was and is needed still.

Movement Science, based on different names by different disciplines, has become universally important because it concerns every human being regardless of any differences. Movement Science, according to the University of Idaho (2021), is a professional discipline where one can study movement, physical activities, exercise, performing arts, leisure or recreation, sports, health and injury care and prevention to promote a healthy and productive professional practice and lifestyle. The University of Idaho with a department of Movement Sciences, under the College of Education in the Faculty of Health and Human Sciences, aspires to cultivate healthy and physically active lifestyles to sustain the wellbeing of individuals and communities as its vision. In Kenyatta University in East Africa, the entire curriculum restructuring led to creating the School of Education in which a School of Public Health and Applied Human Science houses the following: Departments of Physical Education and Exercise and Sports Science, Community Health and Epidemiology, Environmental and Occupational Health, Health management and informatics, and Population, Reproductive health and Community Resources. This a move to meet their nation's needs and to avoid unhealthy competition.

Movement studies, therefore, create perspectives for long-term interdisciplinary studies (thus providing opportunities to all specialists in all scientific disciplines).The current trend in Nigeria demands the need to develop new course of studies that meet the societal needs rather than general courses that limit career prospects. More encompassing names include Kinesiology, Human Performance/Sports Performance, Movement Science and Management, among others.

Exercise and Sport Science - A Multidisciplinary Specialization

Exercise and Sport Science is a multidimensional discipline that integrates all aspects of human movement to develop, improve health, sports performance, and total body functions. Exercise and Sport Science proffers multidisciplinary solutions to performance problems in different practical settings through a balanced view of issues influencing participation in physical exercise and sports. A multidisciplinary solution is the capacity to integrate knowledge and modes of thinking drawn from two or more disciplines. For example, explaining a phenomenon, solving a problem, creating a product, or raising a new question in ways that would have been unlikely through single disciplinary means (Mansilla, 2006). This view enables observing the interlock of physiological, biomechanical and psychological dimensions of movement and developmental processes, nutritional pattern, social system and environmental influence on the athlete's or exerciser's movement either in sports performance or health promotion.

The multidisciplinary dimensions of Exercise and Sports Science are Exercise Physiology, Exercise and Sports Psychology, Sports and Exercise Biomechanics, Motor Behaviour (Theories of motor learning, motor control and development), Sports Nutrition, Sociology of Sports and Management of Sports. The field of Exercise and Sports Science focuses on physical fitness and training related to two broad areas: health (involving populations that are healthy or have pre-existing medical conditions) and performance (involving populations whose primary goals are athletic, competitive or related to sports performance) (Temple University, 2021).

Physiological Dimension of Exercise and Sport Science: Physiological dimension of Exercise and Sport Science or Exercise Physiology is concerned, with the way the body responds to exercise and training. Courses in anatomy and physiology aim to develop knowledge and understanding of the basic structure and function of the human body, discuss how this

knowledge can be used to improve health and/or performance through the body's responses to exercise and sports. Furthermore, it studies how the body responds to limitations due to environmental influences such as altitude, heat, cold temperate among others and how athletes and exercisers can acclimatize in such a delimiting environment to optimize performance either for health or sports competitions. Exercise physiology is concerned with how the body from a "functional standpoint of view" responds, adjusts and adapts to exercise.

Exercise Physiology is an academic programme of study, as well as a course in Exercise Science, Human Kinetics or Physical Education or Kinesiology (HKE 302 in the University of Ilorin. **Clinical Exercise Physiology** is a sub-component of Exercise Physiology that involves the application of exercise physiology principles, knowledge and skills for purposes of the clinical rehabilitation or diagnosis of disease or disability in humans.

Benefits of the Study of Exercise Physiology and my Research Pursuit in Exercise and Sports Science

Mr. Vice Chancellor Sir, the focus of my Master degree was purely Exercise Physiology. Exercise physiology as a course/programme is helpful in

- understanding different kinds of Exercises (strength, endurance, flexibility, etc.) and the benefits the body derives from them; ascertaining cardiovascular (the structure of the heart and blood vessels) and physiological adaptations to physical training; and studying various kinds of cardiovascular exercises and their long and short-term effects on the body based on experimentation.
- determining the relationship between exercise and coronary artery disease; primary and secondary prevention of cardiac diseases risk factors; and related disease risks.

- establishing training programmes for fitness, health and performance;
- athletic training: Background of professional training, physiological adaptations; and recommendations for aerobic and anaerobic training, nutritional needs and physical activity among others. It is a core course in optimising movement health and performance.

Sports and Exercise Psychology Dimension: This sub-discipline of Sport and Exercise Science answers questions about human behaviour in sport and exercise settings. Psychological factors may contribute to whether an individual achieves success and optimal performance in sports, and may also affect whether individuals choose to engage with exercise. The psychological dimension of human movement studies is designed to provide a scientific understanding of human behaviour, experience and the complex interactions between them in competitive and recreational sport and exercise.

Common psychological skills in the field of Applied Sport and Exercise Psychology are: self-confidence in sport and exercise-self efficacy, arousal/stress/anxiety or energy management, attention and concentration control (focusing) goal-setting process, performance outcome, short and long term goals; imagery, visualization and mental practice; preparation for competition-self-talk, team building, time, motivation (positive, negative, intrinsic, extrinsic), a motivation; communication and techniques; and management/organization.

Motor Control, Motor Learning and Motor Development: Motor Learning, control and development studies the acquisition of gross and fine movement skills and how they are transformed into fundamental and specialised skills for activity of daily living, movement behaviour and specialized skills in recreation and sports performance. According to Cech and Martins (2013), motor development includes the change in motor behaviour over the life span and sequential, continuous, age-related process of change determined by the combination of genetic predisposition

for movement and environmental changes in the process. Motor (physical) development of a child involves physical growth and strengthening of the bones and muscles and acquiring the ability to move as well as touch his/her environment.

Motor Control and Motor Learning are central to the discipline in Exercise and Sports Science in which motor control is concerned with the physiological process whereby motor development occurs, while motor learning allows motor development to occur systematically, resulting in a permanent change in motor behaviour due to experience. Knowledge of motor development across lifespan is critical for therapists and exercise scientists to ascertain appropriate exercise prescription and training design strategies for people to function optimally (Cech & Martin, 2013). Hence the importance of norms in relation to age, gender and body built to determine individual's movement health and performance.

Gross motor skills acquired during childhood is part of a child's motor learning. By age two, almost all children should be able to stand up, walk, run around, climb the stairs or chairs. Good movement health at childhood tends towards healthy physical culture in adulthood and naturally developing good mechanics in locomotive, non-locomotive and fundamental movements which are transferred to specialized skills needed in physical activities and sportive motions (Dominic, 2018).Motor development is inherently intertwined with psychological development, as motor skills children afford and constrain their experiences; hence, the learning input they receive (Adolph & Hoch, 2019).

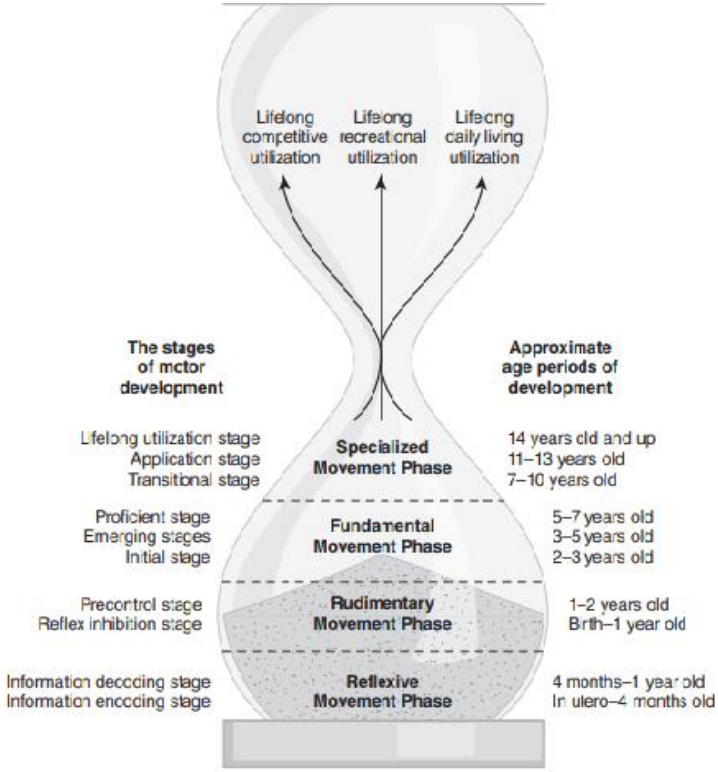

Fig. 10: The phases and stages of Motor Development (adopted from Jones & Bartlett 2007 in Adoph & Hich, 2019)

There are four basic motor development movement phases and they are reflexive movement phase (involuntary movements of the fetus); rudimentary movement phase (first forms of voluntary movement seen in infant beginning at birth to about age two); fundamental movement phase (acquisition of skills of early childhood-a period young children are actively involved in exploring and experimenting with the movement potential of their bodies); and specialized movement phase (when movement becomes a tool applied to a variety of complex

movement activities for daily living, recreation and sports pursuits (Logan, et al., 2015; Jones & Bartllet, 2007 in Adoph & Hich,2019).

The academic discourse on the proficiency of fundamental movement skills acquisition suggests that by 5 -6 years children should be able to apply specialized skills – an important consideration of Long-term Athletes Development in Sports Studies. Though some children may reach this stage primarily through maturation and environmental influence (exposure) as in communal living, space availability, peer group and extended family training, the vast majority require significant practice encouragement and institution in an environment that fosters learning as found in school settings, religious settings and parks and recreational avenues.

Sociological Dimension of Human Movement

Sociological dimension of human movement utilizes sociological methods and inquiry to inform individual practice towards physical literacy towards physical activity, exercise and Sports. Such individual or group practice challenge the conduct of their own beliefs in sport and exercise in the society. In Sociology of Sports, concepts such as socialization, media, youth, sports, gender, race, ethnicity, globalization and sustainability are contrasted. Sports and physical activity are deeply embedded in the society leading to the need to examine the many social and cultural factors that influence human physical movement, physical activity, behaviour of groups of people or societies.

Studies have shown that human movement noticeably in routine activities of daily living, physical activity and exercise, sports and PE are motivated either as participants, by talking to friends and family about physical activity and sport or by watching as spectators. Sociological dimension of human movement in sports binds Nigeria together in Sports during National Leagues, European Leagues, international Mega-sports without consideration of social class distinction. This

sociological dimension also explains the performance of athletes in any sport event as determined by relationships that exist between coaches, athletes and sports stakeholders. Social processes in sport strengthen public opinion as a prestigious sphere of employment and promote cultural linkages (Sharkov & Silkin, 2020).

My interest and contribution in the sociological dimension of movement in elite sports led to an investigation of the communication techniques coaches adopted to relate with athletes in training and before, during and after matches. The findings revealed that no matter the level of skill and fitness, communication of coaches with athletes, within athletes, and between athletes and coaches contributes to correct human movement, learning techniques and performance at all levels. Furthermore, the level of coaches' communication techniques tends to determine losing or winning as well as human involvement in Sports for all (Dominic, 2005).

Biomechanical Dimension of Sports and Exercise

Mr. Vice Chancellor Sir, the biomechanical dimension is my dream area of focus but has become a mirage due to lack of necessary tools (lab tools and equipment). All human movements are produced and modified by internal or external forces. The extent of movement is explained by the interplay of forces and techniques and the musculoskeletal system, the basics of mechanical principles for human movement; hence the study of Biomechanics of Sports otherwise referred to as Physics of Sports. Biomechanics of human movement with an emphasis on Sports and Exercise is the discipline that studies the techniques of human movement using the tools of mechanics and interrelationships of Anatomy and Physiology, and Mathematics to improve performance.

Biomechanical Analysis in Sports, Exercise and Musculoskeletal Health

Biomechanical analysis is the systematic study of human movement that involves careful observation, and the use of instruments to measure body movements, body mechanics and muscle activity (Lu & Chang, 2012). Simply put, it is the analysis of movement techniques. Biomechanical analysis can be performed using one or all of the quantitative, qualitative, or predictive methods to gather information about the mechanics of the musculoskeletal system when executing a motor task and to determine how best movement may be produced to enhance the structures and functions of the body, understand injuries and promote health.

Human motion analysis requires a simple process such as careful observation of planes of movement, axis, posture, range of motion and so on for correction of gross anomalies without using any equipment. This method is subjective and depends on the skill of the analyst, like most coaches, paramedics, and sports and exercise professionals do during normal interaction with athletes, clients, or patients. Objective methods are the quantitative and predictive methods that involve the use of simple equipment (stopwatches, accelerometer, pedometer, andgoniometreetc) to sophisticated and expensive equipment such as highly sensitive force platforms, and electrogoniometre (Elgon) and multi-camera motion capture systems. Measurement techniques are constantly evolving as technology improves (Hall, 2021).

Quantitative analysis implies that numbers are involved in measuring the temporal, kinematic and kinetic variables of motion. This method is specifically used to monitor changes in technique, improvements in training, progress in rehabilitation after injury, provide biomechanical research data on a specific athletic ability, the effects of exercise interventions on gait, musculoskeletal function and body composition parameters. The predictive method uses a computer model of a person or a tool to predict the changes that would occur in a movement as a result

of changes in input parameters (Dominic, 2006; Hamill, Knutzen & Derrick, 2015).

Equipment for biomechanical measurements is classified into kinematic, kinetic and computer simulation tools. The most common kinematic tools are timing systems (stopwatch, photogate timers, pressure-sensitive mats), speed measurement systems (based on radar or laser light), accelerometers, microelectromechanical systems (MEMS) inertial sensors and optical imaging systems (film cameras, video cameras, etc.). Full-body motion capture (mocap) systems can use one or more of these technologies to record and quantify human movement in two or three dimensions. Tools for measuring kinetic variables in biomechanics include force platforms, strain gauges, pressure sensing devices, dynamometer and electromyography (EMG) (Dominic, 2006; Hamill, Knutzen& Derrick, 2015).

Computer simulations are based on mathematics with the use of equations derived from Newton's law of motion. They are mainly used for analysis in sports to predict the outcome of a movement based on certain input parameters. The input parameters include the inertial properties of the body and its limbs (mass, lengths, moments of inertia), the initial conditions at the start of the simulation (positions and velocities of the body and limbs) and the time histories of the functions control. They are also used for rehabilitation of injury to assess surgical repairs or to assess prosthetic devices before surgery. A major limitation of computer simulation is that a person's input parameters are only useful for them. However, it can help predict what and how parameters can be changed to improve movement techniques. Other biomechanical analyses are physical, anthropometric and body composition. The assessment of these variables can also be used for ascertaining training and exercise needs, response to exercise programmes as well as predicting the health status of each individual.

Musculoskeletal Biomechanics and Health

The musculoskeletal system refers to the interconnected and interactive functions of the skeletal system and the muscular system as the primary centre of human movement. The efficiency of movement depends on the integrity of the musculoskeletal system. One of the recent sources of traumatic health problems is musculoskeletal pain affecting men, women, the elderly and young people. Musculoskeletal pain is pain that results from conditions that affect muscles, ligaments, tendons, and bones.

There are over 150 musculoskeletal conditions that affect the locomotor system of individuals, some of which occur suddenly and are short-lived; for example, fractures, sprains and strains. Others may be permanent conditions associated with functional limitations and continuing disabilities as a result of poor movement mechanics. The World Health Organization (2020) reported that approximately 1.71 billion people suffer from musculoskeletal disorders worldwide and are the largest contributor to disability globally. Low back pain is the leading cause of musculoskeletal disorders with a prevalence of 568 million people and the leading cause of disability in 160 countries (WHO, 2020). The problem of musculoskeletal pain is complex and wide-ranging and includes different types of pain such as neck pain, limb pain, lower back pain, bone pain associated with pain in the joints and chronic generalized pain among others (International Association for the Study of Pain [IASP], 2021).

One of the factors responsible for the increase in musculoskeletal pain in Nigeria is technological advancements that lead to a low level of movement. In one of our studies, we found that the use of ICT devices such as computers, mobile phones and tablets was a common cause of musculoskeletal pain in the University of Ilorin Community (Dominic et al., 2018). Ayaniyi and Udofia (2016) also reported high lifetime (54.5%) and point prevalence (51.7%) of musculoskeletal pain among undergraduates at the University of Ibadan with a high

prevalence in male students. There is a need for intervention and knowledge of biomechanics is useful as such.

Performance and Movement Studies

Concept of Performance

Mr. Vice Chancellor, Sir, the term 'Performance' was recognised in the mid-nineteenth century and was first used in defining the results of a sporting contest from Marston's motto "Don't lower your expectations to meet your performance. Raise your level of performance to meet your expectations" (Iuliana, & Criveanu, 2016). This led to the development of theories from various fields with particular attention to the works of Turner (1988) and Schechner (1985), who illuminated the performative nature of societies around the world, how events and rituals, as well as daily life, were all governed by a code of performance.

Performance theory suggests that 'every one of us puts on a performance in our society, whether through the clothes we wear, the conversations we hold or the food we eat. All are a performance designed as a signal-system to ourselves and others for our place within our social group' (Goffman 1969;Institute for the Public Understanding of the Past and the Institute of Historical Research, 2007), the social roles we play in the family, community and the society at large. Furthermore, performances seek to reinforce and communicate our identities in society. When an individual plays a part he/she implicitly requests his observers to take seriously the impression that is fostered before them such as the spectators in the sports meet, they are asked to believe that the character they see possesses the attributes he/she appears to possess, that the task he/she performs will have the consequences that are implicitly claimed for it, and that, in general, matters are what they appear to be (Goffman 1969: Institute for the Public Understanding of the Past and the Institute of Historical Research, 2007).

The concept of performance assesse show individuals act and react in the world. It is a means of understanding how people situate themselves in the world, for themselves and others

(Institute for the Public Understanding of the Past & the Institute of Historical Research, 2007). This concept of performance enlightens on the interaction and interlock of performance with human behaviour, human movement characteristics/disposition to family, communal health, wellness and mobility. Performance leads to success, competitiveness, action, effort and progress because of its focus on the capacity of the subject (individual) to register progress as a result of the efforts to achieve or surpass defined goals (Iuliana, & Criveanu, 2016).

Performance and Movement Interactions

Performance is a multidimensional abstract concept whose measurement depends on several factors including the movement enterprise 'organizational performance', the physical activity and exercise programme, department or movement professionals involved, manager and the performer with the measurement objectives of assessing the effect of performance and performing behaviour (Bates & Holton, 1995; Iuliana, & Criveanu, 2016) of our engagement in movement for life. The measurement of performance effect might be based on the following expected outcomes:(i) developing health-related physical fitness (muscular strength and endurance, flexibility, body composition and cardiovascular endurance); (ii) elite sports (competition); and (iii) rehabilitation (stroke, elderly gait, cancer)or therapeutic (management and control of overweight and neuromuscular problems and poor posture and movement limitations). These outcomes are necessary attributes for optimised job performance, reducing the risks of musculoskeletal problems, obesity and metabolic disorders.

Performance is also relevant in determining the efficiency of curriculum design and implementation of professional training programmes, exercise prescription and administration based on normal/special population. Furthermore, these outcomes help in assessing the effectiveness of the set objectives for performance. This is long overdue for the programmes of Physical Education or Kinesiology, Sports

Management/Administration in totality to meet the needs of the contemporary society.

Mr. Vice Chancellor, Sir, I want to call your attention that what is ongoing with the minimum benchmark for our Physical Education/Human Kinetics/Sports Science curriculum in Nigeria are just (i) change of name and (ii) modifications rather than restructuring to meet societal needs and best practices. Change is inevitable if the course of study must meet the needs of our community and help our graduates find their feet to stand tall independently. Poor performance has been attributed to either individual's level of physical literacy and physical culture of the community where he/she belongs, attitude to change, disposition to set objectives, acceptability and level of participation. Inadequate movement education promotion, acceptability and implementation have cost the society and all its social systems loss of manpower, huge medical bills due to cardiovascular disease, metabolic disorders, rising morbidity and mortality rates (Dominic et al., 2018).

Sports and exercise science is emerging and focuses on collaborative efforts to optimize human performance through movement behaviour patterns and interaction with the environment as in the home, school, workplace and/or interaction with implements and interrelationships within social groups, sport and other physical activity settings. The Sustainable Development Goals (SDGs, Goal 3) of Good Health and Well-being's mission statement '*To ensure healthy lives and promote wellbeing for all at all ages* is a proven fact on the need to develop a focused curriculum-based movement education programmes at all educational levels to optimize societal movement health and performance, to reduce the high cost of non-communicable diseases (NCDs) and mortality rate.

Movement and Pain: The Physical Activity Interlock

Generally, pain refers to an uncomfortable bodily sensation. Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue

damage or described in terms of such damage" (Zhang, Wenk, Honda & Giesler, 2000; Korsah & Dominic, 2018; International Association for the Study of Pain, 2021). Clinically, pain is often the primary motivator for people to seek medical care, while simultaneously serving as a common barrier for adherence to the prescribed movement (Jack, McLean, Moffet&, Gardiner, 2010; Sandford, Sanders, Lewis, 2017; Merkle, Shika& Frey-Law, 2020). Pain can produce a large range of movement changes from subtle motor compensations during task completion to muscle spasms or complete avoidance of painful movements and/or activities (Hodges &Smeets, 2015) leading to poor movement mechanics. Studies have described that pain and movement are universally relevant phenomena that influence human experiences in readily observable ways (Merkel et al., 2020).

An in-depth understanding of pain and movement relationships will be beneficial not only in medical and rehabilitation guidance but also in the prevention and promotion of healthy neuromuscular joints/systems of the human body taking advantage of physical activity lifestyle. Several theories have established the interaction between human movement and traumatic situations and responses. Merkel et al. (2020) highlighted four classes of theories that explained the relationships between pain/nociception and common motor responses. They include vicious cycle theory, strength inhibitory theory, pain adaption theory and protective response theory.

Neuromuscular adaptations in response to muscle pain have been implicated in the transition from acute to chronic musculoskeletal pain conditions (Graven-Nielsen & Arendt-Nielsen, 2008; Hodges, 2011) and can lead to functional impairment and disability. Thus, an understanding of the interplay between pain and motor responses may facilitate improved medical and rehabilitative outcomes (Merkel et al., 2020) as well as taking advantage of exercise as a non-pharmacological intervention with very minimal to no side effects compared to medicals. Although pain may have an

advantage by signalling to us to protect us from injury and potentially harmful stimuli, prolonged or dysfunctional neuromuscular adaptation in response to pain might contribute to disability and chronicity in a variety of pain conditions (Merkel et al., 2020).Also, pain is associated with a substantial reduction in self-reported health and functioning of the body joints and systems which might result in disabilities and neuromuscular disorders and other preventable NCDs.

Pain complaints are common and costly with a reported prevalence of acute (current) pain ranging from 27% to 49% while the prevalence of chronic pain (long-term or persistent) range from 11% to 64% (Landmark et al., 2012; 2013). Common pain conditions are major reasons for work-related disability and low productivity and loss of manpower in the workforce (Stewart, Ricci, Chee, Morganstein & Lipton, 2003; Gjesdal, Ringdal, Haug & Maeland, 2004; Landmark et al., 2013). The health care expenditures among people with common pain complaints were estimated to be more than twice as high as for those without pain complaints and their pain seem to continue escalating (Martin, Deyo, Mirza, Turner, Comstock et al., 2008; Eriksen, Sjogren, Ekholm& Rasmussen, 2004; Manchikanti, Singh, Datta, Cohen, Hirsch, 2009).

Our study of the Nigerian youths has proven that a sedentary lifestyle contributes to diverse pains of the musculoskeletal disorders (Dominic et al., 2018) and is associated with impaired movement (physical activity and exercise) (Landmark, Romundstad, Borchgrevink, Kaasa, Dale, 2013; Korsah & Dominic, 2018). Other studies also supported that promoting a healthy lifestyle in the whole population may have beneficial effects on the prevention of pain complaints and its consequences (Bergman, 2007; Landmark, et al., 2011), use of endorphin release therapy was also effective in alleviating pain among injured athletes in Senior High School, Central Region of Ghana. Hence, this therapy is recommended for quick recovery and return of injured athletes to performance and ultimately health and wellbeing.

Wellness Continuum and Movement Interaction

People often consider wellness to be a state of not being ill or in good physical health, however, wellness is more encompassing. Wellness refers to holistic wellbeing. The attainment of wellness requires fuelling and conditioning the body, engaging the mind and nurturing the spirit. Although it includes striving to be healthy, Stoewen (2017) noted that wellness is more about living life fully as a lifestyle and personalized approach of living that allows a person to attain the best that his/her potentials, circumstances and fate permits.

There is continuous interaction between the state of health, illness and quality of life on the path to wellness. As such, it is difficult to separate the life of an individual from these variables but to modify, minimize or adapt them in any form whatsoever. To achieve this, individuals need good stewardship for themselves, those under their care, those who care for them as well as others (Talabi, 2016; Stoewen, 2017)- a fading culture in our communal lifestyle.

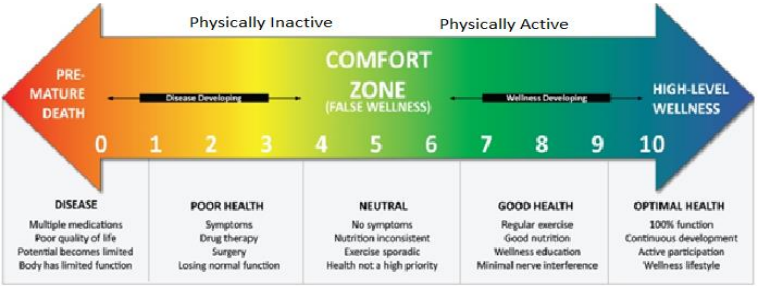

Fig. 11: Movement-Wellness Continuum

The movement-wellness continuum represents a spectrum wellbeing state lying between two critical zones, red and blue. The red zone is when the body is in crisis due to disease(s) and the blue zone is when the body is in peace or boon due to a state of optimal health. The numbers 0 – 10 depict the body's level of organisation from health states or disorganisation from disease states. Most people believe there is no need to be

cautious until they get to the yellow zone at point 3, which is the level where disorganisation of the body manifests intolerable symptoms that lead to poor health and quality of life. A lot of us are in the comfort zone, which is represented by points 4, 5, and 6 because of the comfort we often seek. People within this zone feel that they are healthy enough; they may experience minimal to no symptoms and do not make efforts towards or are inconsistent in healthy behaviours of nutrition, sleep, stress management, exercise among others, as they do not seem to be highly prioritised. The comfort zone is very significant because it is the mid-point between the red and blue zones and the point where behaviour modification towards wellness should begin. This means those in this zone have all the chances of avoiding health crises by acting to improve on the various domains of wellness. Getting in the green zone is an indication of gains from consistent positive behaviours, however, movement professionals aim to get people in the blue zone as this is where optimal wellness can be attained. Hence, the wholistic objective of exercise and sport science.

The Dimensions of Wellness

Wellness generally encompasses eight mutually interdependent dimensions that must each be given attention. Individuals are encouraged to strive for balance among all dimensions because if any is neglected, it will affect others over time and might eventually lead to negative health, fitness, wellbeing and quality of life consequences. The dimension of wellness are:

Intellectual Wellness - requires (i) growing intellectually, maintaining curiosity about all there is to learn, value lifelong learning, and responding positively to intellectual challenges; and (ii) expanding knowledge and skills while discovering the potential for sharing your gifts with others

Emotional Wellness - requires (i) understanding and respecting your feelings, values, and attitudes; (ii) appreciating the feelings of others (empathy); (iii) constructively managing your

emotions; and (iv) feeling positive and enthusiastic about your life.

Social Wellness – requires (i) maintaining healthy relationships, enjoying being with others, developing friendships and intimate relations, caring about others, and letting others care about you; and (ii) contributing to your community.

Spiritual Wellness - require: (i) finding purpose, value, and meaning in your life with or without organized religion; and (ii) participating in activities that are consistent with your beliefs and values

Occupational Wellness – requires (i) obtaining personal fulfilment from the work you do and performing with honesty, enthusiasm, and engagement regularly; and (ii) attending a career fair or networking event; (iii) finding a work-life balance, including making time for hobbies and taking a vacation; (iv) making professional goals to pursue; and (v) joining professional groups in your respective field.

Financial Wellness – requires (i) managing your resources to live within your means, making informed financial decisions and investments, setting realistic goals, and preparing for short-term and long-term needs or emergencies; and (ii) being aware that everyone's financial values, needs, and circumstances are unique.

Environmental Wellness – requires (i) understanding how the social, natural, and built environments affect one's health and wellbeing; (ii) being aware of the unstable state of the earth and the effects our daily habits have on the physical environment; and (iii) showing commitment to a healthy planet.

Physical Wellness – Lastly, physical wellness is about taking care of the body to stay healthy now and in the future. Physical wellness is linked to physical health (or internal safety) and involves understanding that good diet, exercise, and healthy lifestyle choices are important (Rehman, Syed, Hussein & Shaikh, 2013). Physical wellness recognizes that our daily habits and behaviours have an impact on our overall health, wellbeing

and quality of life (UC Davis, 2019). Hence, the emphasis on physical literacy.

Movement is essential for physical wellness, not only to support the individual but also for the physical, social and cultural wellbeing of the community as a whole. The body, as a functional machine, to achieve its goals in life, must be healthy and fit, which can be developed through proper movement that improves the use of nutrients for adaptation and allows adequate rest and recovery from stressful situations. Our energy intake (food) must be equal to our energy expenditure (less movement, less food). This is essential to prevent overweight and obesity risks. Awareness of movement must therefore be seen as a necessity for leading a physically active life. Awareness and action to take care of one's body through healthy movements (formal and informal) (Dominic et al., 2018) also lead to positive lifestyle choices that support bodily functions.

The Northwest University (2021) stated the goals of physical wellness as (i) understanding how and why one's body works; (ii) satisfaction with physical appearance; (iii) making an informed decision about one's body and sexuality; (iv) feeling comfortable to perform physical activity; (v) developing well-balanced and healthy eating habits; (vi) being a responsible drinker; preferably, a non-drinker; (vii) having awareness of the deleterious effects of insufficient sleep, stress and inactivity on the body (movement behaviour); (viii) having awareness of how food, beverages, drugs, chemicals and caffeine affect the body; (ix) seeking medical care timely for treatment of illness, injury and preventive purposes; and (x) engaging in regular movement to develop healthy body composition, flexibility, strength, cardiorespiratory and mental fitness.

Movement Implication for Wellness

Wellness is a holistic commitment to positive health behaviours. Movement makes the body strong and healthy and appreciated for what it can be used for rather than the way it looks. Psychological balance can help improve mental and

intellectual wellbeing reducing symptoms of depression, anxiety, pain and loneliness.

Movement is, therefore, necessary to help improve mood, reduce stress from high cost of living, improve performance and job satisfaction, gain self-confidence, and the ability to discuss issues and seek support. A healthy and fit body is much better for withstanding spiritual struggles, as a person with such a body can hold higher convictions with patience and faithfulness in his/her potentials; a great need to overcome our current security and monster-corruption challenges in Nigeria. Through structured and unstructured movements, adults can better appreciate the need to make the community and the natural environment healthy and safe while children can learn as well as discover the importance of the environment and the need for peace and tolerance in social interactions. Therefore, the more we strive to improve movement, the more we increase our capacities and capabilities for a healthy lifestyle.

Movement and Mortality Risk

A lot has been espoused on movement, its components, forms and mechanics. In the exercise and sports science field the discussion of human movement is incomplete without mentioning physical inactivity (inactivity or low physical activity) and sedentariness. The reason is that regardless of age, gender, physical fitness and health status, inactivity and sedentariness are unhealthy human movement behaviours that increase the risk of mortality. Physical inactivity is defined as not engaging in any form of PA of moderate or vigorous intensity, or engaging in PA that does not meet WHO's recommendation to participate in PA per week (WHO, 2020). Sedentariness, on the other hand, has been operationalised to include activities of very minimal movements and total time spent during waking hours on reclining or excessive sitting (Trembley *et al.*, 2017).

A mention of the word "mortality" often rightly brings to our minds "death", which is an inevitable end of the total

biological functions of every organism. The National Cancer Institute (NCI) (nd.) defines mortality as the state of being mortal (or destined to die). The NCI added that in medical parlance, mortality is used to refer to death rate or the number of deaths in a certain group of people in a certain period and may be reported for people who have a certain disease, live in an area, country, specific gender, age or ethnic group. In terms of body movement, mortality can arise when an organ is not able to perform its contributory role in body movement. In other words, organ mortality might lead to system mortality if there is an inability to restore the lost function and eventual mortality of the individual if degeneration is not remedied or stopped. Physical symptoms of the organ or systemic movement mortality include excessive body weight gain and body fat accumulation (leading to unhealthy body composition), musculoskeletal defects and trauma, physiological problems (eg., constant fatigue and stress), poor cardiorespiratory and strength fitness. These symptoms have significant negative implications for health, wellness and quality of life as found in one of our studies of civil servants in Efon Local Government who had a high risk of metabolic and cardiovascular diseases due to poor body composition indicated by their BMI, WHR and %BF risk (Dominic, Abolarin, Seidina, Atikumi & Ahmed, 2017). This might have resulted in frequent mortality among the civil servant during active service or shortly after their retirement. Interventions for people with these symptoms may include medical care or movement regimen or both depending on the severity.

Sedentariness- An Independent Risk Factor of Mortality

Mr. Vice Chancellor, Sir, sedentariness is regarded as an independent risk factor for cardiovascular and metabolic diseases that increase the risk for mortality (Trembley *et al.*, 2017). For example, overweight, obesity and other diseases (such as cancer, type 2 diabetes, sleep apnea, psychosocial problems etc.).These diseases can also be comorbidity diseases that increase the risk of cardiovascular and metabolic diseases mortality.

Contemporary epidemiological studies link sedentariness with the risk factors of these diseases. Engaging in exercise or other forms of physical activity is the most potent way to decrease inactivity and sedentariness and these are known to induce dose-response health and fitness benefits on the body. An underlying risk to most individuals including active people (athletes and those who exercise regularly) is that sedentariness is often a common habit that is entrenched by various socio-environmental needs. For example, occupation, use of vehicles, studying, social life, relaxing etc. Our awareness actions against sedentariness are, therefore, necessary to avoid mortality.

Several studies confirming the risk of mortality from sedentariness supports this necessity. For example, the study of Dominic, Ibraheem, Seidina and Niyi-Odumosu (2017) found that despite most of them meeting physical activity recommendations, ICT-induced sedentariness led to excessive body fat accumulation which is an indicator of sedentary death syndrome (SEDs) among sandwich students of University of Ilorin. Brown, Williams, Ford, Ball and Dobson (2005) reported that the odds of substantive weight gain of > 5kg over five years was significantly higher among those whose average sitting time per day was ≥ 8 hours per day compared to those who sat < 3 hours per day. In addition, Shields and Trembley (2008) reported that obesity rose from 14% to 25% among men whose average TV time was ≤ 5 hours per week to ≥ 21 hours per week and from 11% to 24% among women independent of leisure-time physical activity and diet. Studies in children also revealed that sedentariness increases mortality risks. The risk of hypertension in obese children was increased 3.3times among those who spent ≥ 4 hours viewing TV compared to those who spent < 2 hours per day viewing TV.

Based on this evidence, a positive movement behaviour which includes complying with physical activity and sedentary behaviour recommendations is required to confer health, fitness, wellness benefits and minimise mortality rate or at least improve one's quality of life. *When people engage in movement targeted*

to meet the WHO recommendations for PA, they reduce physical inactivity and when they inculcate into their daily lifestyle practices the reduction of sedentariness, they sustain the benefits their bodies have gained from movement and ultimately reduce their risk of mortality.

An intervention study that we conducted on hemiplegic stroke survivors post-traumatic experience revealed that an eight-week twenty metres walk improved cardiorespiratory fitness and strength of the shoulder extensor, hip extensor, and dorsiflexor of stroke survivors outpatients in two tertiary hospitals in Osogbo, Nigeria (Ojo, Dominic, &Adeyemi, 2021). The increasing drive for physical exercise and fitness calls for resultant awareness and education on the proliferation of Fitness Centresin Ilorin Metropolis using the services of unqualified Fitness Instructors. An appraisal of these fitness centres in 2016using the Researchers' Modified National Science Foundation (Dominic, Adeoye, Kolawole, Ibrahim &Niyi-Odumosu, 2012) and the American College of Sports Medicine (2012) checklists revealed that only six fitness centres were functional while only two met the standards but mostly used non-professional fitness instructors; a barrier to patronage and exercise adherence. Therefore, regulatory measures to prevent accidents and injuries to clients and a short course training for Fitness Instructors were recommended. A follow-up study to ascertain the change in this trend is ongoing. In addition, two professional diploma courses domiciled in the University of Ilorin Business School have been approved for such professionals' development.

The Need for Implementing Formal Movement as Routine

Movement has always been a basic necessity, practice and heritage of man's survival dating back to the primitive era of crude tools primarily due to his livelihood as a hunter, gatherer or peasant farmer. At that time there were no vehicles and man had to move; the brain memory was the main store of information that enabled man to navigate their path to and from

their outings. Neuroscientists found that movement is very helpful to the brain's function leading to better memory, creativity and efficiency in life endeavours (Roy, 2014) and these are crucial to all endeavours man perform from primitive to modern times.

It was recently discovered that movement reverses the shrinking of the hippocampus, a part of the brain responsible for memory. According to Suzuki (2018), 30 minutes of aerobic exercise (e.g., walking) a day makes the prefrontal cortex and the hippocampus bigger and stronger. This helps reverse the continuous 1% annual decrease in the hippocampus that begins after the age of 30. Unfortunately, our high dependence on technology for most tasks in modern times is doing us a great disservice despite a better health care system, communication, education among others. We are faced with the rising challenges of chronic non-communicable diseases especially obesity, cardiovascular and metabolic diseases.

One of the major technological inventions that threaten human adoption of movement lifestyle behaviour is the Information and Communication Technology (ICT) devices. They range from bulky household and office devices (desktop personal computers, television, dish and cloth washers, etc.) to portable sophisticated devices (mobile phones, tablets, Bluetooth, AirPods, etc.), that are internet-enabled. They are so amazingly addictive that they reduce human movement all over the world (Oxford Busines Group, 2021). Dominic et al. (2018) found that prolonged ICT use was a predominant behavior among tertiary institution students in Kwara State with an average usage of nine 9½ hours daily. Also, in a recent study of the consequence of the COVID-19 lockdown, it was discovered that physical inactivity increased tremendously among Nigerians while sedentariness linked to ICT use escalated (Dominic, Seidina, Niyi-Odumosu & Adeoye, 2021). Other risk factors for the inability to embrace formal movement are the craving for executive/elaborate lifestyle of the affluent, elite and the generational mediocrity of seeking insufficient/unavailable

white-collar jobs which are fast becoming a bane of the youths in Nigeria.

Collaborative Prescription for Holistic Movement

Mr. Vice Chancellor, Sir, a recent approach to consolidate movement behaviour as a habit to prevent diseases, promote and sustain health, fitness and wellness is making movement practices domiciled into the health care delivery process and community-based actions. This includes exercise is medicine, exercise is medicine on campus and exercise is vaccine.

Exercise Is Medicine (EIM) Protocol

EIM is a global health initiative that was co-established in 2007 by the American College of Sports Medicine (ACSM) and the American Medical Association (AMA) and has since been coordinated by the ACSM (ACSM, 2021). The focus of EIM as listed by ACSM (2021) include: (i) ensuring primary health care providers make physical activity part of treatment plans and refer their patients to EIM Credentialed Exercise Programmes and Exercise Professionals; (ii) establishing the belief that physical activity is integral in the prevention and treatment of diseases and should be regularly accessed and treated as part of all health care delivery; and (iii) curbing the fast-growing public health problem of physical inactivity and sedentariness.

Strategies for Achieving the EIM Focus

This is referred to as EIM Solution. EIM Solution has three basic modules for establishing physical activity as a standard in the health care delivery system. The modules are:

The EIM Module

Module	Step	Activity
1. Clinical	1	Physical activity assessment
	2	Physical activity prescription/behavioural counselling
	3	Physical activity self-management or referral
2. Community Resources	4	Developing and training community-based physical activity credentialed exercise professionals, establishing referral networks and connecting them with clinics and patients.
3. Active Health Technology	5	Clinical-community integration and utilisation of objective health technology/objective physical activity assessment

Exercise is Medicine on Campus (EIM-OC)

EIM-OC is an aspect of EIM for assisting tertiary institutions to promote physical activity as a vital sign of health care. EIM-OC encourages staff and students to work together towards improving the health and wellbeing of the campus community. The targets for the EIM-OC are (i) making movement a part of the daily campus culture; (ii) assessing physical activity at every student health visit; (iii) providing students with the tools necessary to strengthen healthy physical activity habits that can last a lifetime (e.g., the Wednesday sports programme in University of Ilorin); and (iv) connecting university health care providers with university health fitness specialists to provide a referral system for exercise prescription (ACSM, 2021). I am glad to announce to you that the Vice Chancellor approved the registration of University of Ilorin as one of the International Universities and we are now a member of EIM-OC team.

Exercise is Vaccine

Mr. Vice Chancellor, Sir, it is important to note that exercise can serve as a vaccine in a metaphorical sense, which implies a continuous social and societal effort. Its success requires shifting the responsibility of controlling body weight-induced health problems from the individual to the society. The advantage of this approach is that the success of the prevention depends on individual success; while the institutional effort provides both guidance and support for the individual. This type of collective effort has been successful in controlling various epidemics in the past.

The Goal of the Exercise Vaccine Delivery System is to:

(i) make the school focal point for the prevention of childhood obesity. A registry should be opened to track the child's physical activity profile as it is standard practice to confirm children's health and up-to-date vaccine records during enrollment to avoid the fatal health consequences of diseases.

(ii) since vaccination is well appreciated by individuals and society, adopting it for exercise can make people embrace exercise proactively to control sedentariness and unhealthy nutrition in children and identify those at risk of obesity for necessary referrals; and

(iii) conceptualize and view movement education(PE) as a critical component of the overall vaccination delivery system.

Positioning physical activity as vaccine delivery requires doing the seemingly impossible. That is, not only taking children to the vaccine site (i.e., the gymnasium, fitness centre, stadia etc.) but to ensure: (i) that they regularly receive the daily dosage of physical activity; (ii) that they receive a robust education package with practical evidence on why this life-long, daily vaccination is required; (iii) equipping them with skills to develop and maintain a healthy, enjoyable and productive

personal life must be developed and delivered to them through training of experts; and (iv) establishing a network of health and exercise professionals for easy delivery.

The Built Environment Problems

Most places especially in the urban settings have buildings closely built to one another with no conducive space for leisure-time physical activity, exercise, community-organized sports and roadside walkways for easy pedestrian movement. The city planning is often non-compliant for the location of fitness and sports facilities while the available few are in most cases, located far away from our homes (Kolbe-Alexander, Pacheco, Tomaz, Karpul, & Lambert, 2015). The University of Ilorin has come a long way with tremendous efforts at providing facilities for exercise and sports but has lots more to achieve considering the rising population of the members of its community. By keeping this pace, with other tertiary institutions making efforts in their respective locations, it could be presumed that Nigeria's tertiary institutions are major contributors to encouraging the culture of movement. Furthermore, installing street lights, building walkways and bicycle paths are essential even in community settings to enable legalized shorter routes to locations such as markets, sports centres and hostels, thereby, promoting physical activity and movement behavioural modification.

All work and No Play Syndrome

The craving for a better standard of living has been driving several people into a stress-filled life. For instance, the academics may have to work late into the night researching and updating their knowledge. Similarly, among corporate and government occupations, trading, students etc., there is a high tendency of overworking without observing boundaries between work, rest and stress build-up. In many organisations, both employees and employers agree that physical activity is beneficial to wellbeing. However, daily work schedule (e.g.,

high workload, front line job requirements), workplace practice and norms (resentment from colleagues, no break culture) and organizational beliefs (cost of lost time, public perceptions) were some of the predominant barriers to movement for health and fitness purposes (Ryde, Atkinson, Stead, Gorely & Evans, 2020). Several people adopt unhealthy stress releasing behaviour such as smoking, drinking alcohol, excessive ICT use without integrating any form of health-enhancing movement. The weekends are mostly spent similarly, although some people attend ceremonies, with only a few engaging in recreational sports and exercise, a lot of people still engage in long hours of sedentariness.

Similarly, many parents due to perfectionist mentality, curtail their children from playful movements; instead, they encourage screen-based activities. This has been a factor leading to increasing sedentary behaviours and disease risks such as obesity, compromised cardiovascular health, tracking into adulthood to several diseases and poor quality of life suggesting the human body is not designed for the high immobility that we force on it. There is a need to imbibe formal movement opportunities. The more the body is moved, the better it is.

Mr. Vice Chancellor Sir, There is a need to highlight some of my contributions to Exercise and Sports Science Profession and Challenges before proceeding to the concluding part of this lecture.

My Contributions

Mr. Vice Chancellor Sir, my NCE, Masters and Doctoral researches were in areas of Sports Science with a research interest in basketball. Aside the contributions already mention in the earlier parts of the lecture, some others are further highlighted here. The performance of elite players in intercontinental championships was of concern realising that Africans were considered to possess strength and power, but always lost out due to low performance in scoring. This led to my interest in researching elite basketball athletes of colleges,

state and national teams to proffer solutions. My interest in basketball as a sport arose in 1974 as an adolescent, then rose to become a coach in 1985 till date.

Based on my coaching experience, I observed that overall performance challenges might be mainly related to shooting. This led to studies on determining strength-specific contributions to the shooting ability among elite basket ballers. Since strength is a factor in both health-related (muscular strength, muscular and cardiorespiratory endurance, body composition, flexibility) and performance-related (agility, speed, balance, coordination, power, reaction time) physical fitness components (Dominic, 2011), my studies focused on strength-shooting relationships in basketball for optimal performance (Dominic, 2002; 2006; 2016).

The key findings of these studies were that: (i) for overall general fitness, general strength prescription should be adopted while for individual skill and techniques optimisation, specific strength programme should be designed(Dominic, 2002, 2011); (ii) conditioning of abdominal strength-endurance specifically improve scoring performance in free throw apart from general strength of the leg and arm because the accuracy of ball trajectory is the target. (iii) only the general leg explosive power training was needed for the three styles of shooting (jump shot, set shot and free throw shot) while specific arm strength was necessary for the jump shot ability (Dominic, 2006, 2016). Specific strength is a strength-type of training harmonized with specific skills for optimal performance. Summarily, specific athletic strength harmonized with the technique demanded by the arms (for jump shot), and the abdominal muscles (for free throw shot)are paramount for optimal performance in all shooting styles. Hence, the need for programming for conditioning of basket ballers.

Another study titled, "Making Weight for Sports Performance: Implications for Health of Combat Sport Athletes in Nigeria" came up as a result of challenges and heath risk practices observed during some national events. Weight making,

a practice of losing weight rapidly to fit into a weight category, has been used for several years in combat sports. We discovered that some weight making methods are risky and may lead to physiological deviations and long-term health consequences. Hence, advocated that combat athletes and their coaches should be educated about the long -term effects of weight making practice on the health and sports performance of athletes (Dominic et al., 2017). This calls upon Exercise and Sport Scientists to proffer interventions.

Contributions to Motion Analysis

Biomechanical analysis is a prerequisite for holistic improvement of movement techniques and behaviour for health and performance. The dearth of research facilities and equipment has been my major challenge since I joined the academia. I resorted to movement analysis and body proportionality using mainly anthropometric data and simple machines. Assuch, in my study of "Interplay among Physical Characteristics, Play Position and Shooting Accuracy of Elite-female Basketballers",I used biomechanical analysis tools of anthropometric characteristics and video analysis. The study revealed that elite female basketballers in Nigeria had high shooting accuracy – still visible in our recent performance in the African Women Championships. Contrary to widespread beliefs, the basketballers' shooting accuracy had no significant correlation with height, weight and BMI and was also not influenced by playing positions. Thus, shooting performance at three distance zones during training, talent hunting and team selection were recommended for optimal performance (Dominic, Chado & Gwani, 2018).

Mr. Vice Chancellor Sir, as a Sports Scientist with research interest in motion analysis, familiarising with equipment, methods, calibration, operation and evaluation procedures are crucial to generating credible outcomes. This led to my review of "Methods of Biomechanical Analysis in Sports", an area rarely explored in Nigeria due to the dearth of

equipment. These methods of analysis in sports are qualitative (a subjective method), quantitative (requiring simple to sophisticated instruments) and predictive and neural networks are just read and taught theoretically (Dominic, 2006); hence the challenges to societal business collaboration for problem-solving. biomechanical analysis in Nigeria. Despite this study identifying the equipment, their importance, instrumentation and recommended provision in Nigeria since 2006 (Dominic, 2006), no single biomechanical instrument has been purchased for contemporary research ventures to date.

Basketballers' ability to control ball trajectory is directly dependent on good control of their body's acceleration forces. This indicates that the size, body shape or proportions of players pose constraints on their sports performance. Upon observing that most Kwara State teams frequently performed poorly in the fourth quarter leading to eventual defeats, I conducted another anthropometric data-based study to assess the basketballers' body musculature in relation to performance. The study was titled "Body Composition of Basketball Players- Implications for Peak Performance". The finding of the study was that the musculature of the senior team of Kwara was superior to that of the junior teams. However, their body fat percentage was too low for continuous high intensity work. Towards the end of the third quarter, there is always depletion of the body's energy storage from nutrition causing limitation in strength and shooting accuracy to outscore opponents and defend it till the end of the match. Exposure and similar training, nutritional intervention, carbohydrate loading before competitions to improve the performance ability of the senior basketball players, provision of stipends and part-time jobs and monitoring of athletes' dietary patterns were recommended. The good news is that the State Government adopted the recommendation, now camps players for national leagues with the team becoming one of the top four in the country.

Community Development Services

Mr. Vice Chancellor, Sir, my community development services were aimed at inculcating positive behaviour modification through movement practice. A highlight of these contributions include; Keep Fit on Radio – an exercise programmme for University of Ilorin Community members health and fitness practice and its environ; pioneer chairman of the Unilorin Walk and at Malete Retreat, establishment of the Exercise is Medicine on Campus, an Health Care Delivery and Physical Activity Integration programme coordinated internationally by the American College of Sports Medicine (ACSM). In order to integrate the professional, business and academic community in the evolving needs of movement, I co-established the Exercise and Sport Science Research Group International for collaborative practical solutions to movement problems. This research group currently has membership in Nigeria, Ghana and the United Kingdom. I have been resource person/consultant on various fitness programmes in various organised groups within and outside Nigeria (such as faith-based, corporate organisations, government parastatals and professional associations).

As a University Basketball Coach from 2002 to date, I had opportunities to raise teams that represented the University at local, national and international competitions. Our efforts led to winning the men's gold medal at the West African University Games in 2012. I was the Basketball Coordinator at Unilorin Staff Festival and National Games. Furthermore, I have served on various sports committees within and outside the University as Facility Chairman, and Secretary, Local Organizing Committee of the National Youth Games from 2019 – 2021. Lastly, as a player, I had several opportunities to play at local, state and national competitions in baskeball and handball and have won laurels at all levels for Niger and Oyo States and for the University in squash, just to mention a few.

Challenges to Human Kinetics/Kinesiology Profession

Although the path of this discipline has come a long way, fruitful and constantly evolving, it is like other professions not without challenges. The challenges are highlighted as follows:

Inappropriate Nomenclature

The nomenclature, "Human Kinetics", mostly used for the discipline that deals with movement in Nigeria is preventing us from exploring the actual aim of movement. Human Kinetics, for instance, is a sub-discipline under Anthropological dimension of Human Kinesiology, a broader term used to describe all the sub-disciplines of Human Movement. The name change 'Kinetics' only limits the scope and makes the general populace see it as an old brand with a new name; hence, calling for a new course of programmes with a new name.

The Professionals in the Field

Mr. Vice Chancellor, Sir, many of the professionals in human movement are yet to appreciate the need to diversify and incorporate the full capacity of its sub-disciplines. The founding fathers have laid solid ground in Nigeria and in the new generation/era, professionals should build on their legacy to meet contemporary needs. Seeming supremacy tussle hinders exploring potentials of the various sub-disciplines as some fear losing relevance rather than visualizing greater opportunities that lie ahead. Resistance to change might ruin the professional, subsuming PE into another subject in the Junior Basic Education curriculum is an example.

The Perception of Policy Makers

It is unfortunate that policies in human movement is very narrow and tends to limit the development of the broad sub-disciplines of human movement. For instance, Nigeria's policy on physical activity remains on paper to date despite rising global health challenges linked to multi-dimensional human

movement deficits. Insufficient time allotment to PE remains a problem in many schools that endangers motor skill development for positive movement lifestyle behavior of the pupils and students. Our study on adolescents and youth confirmed that children and adolescents in public and private schools are now found to be overweight and obese (Adeoye et al., 2016, 2017).

The Curriculum Does Not Meet the Prevailing Needs of the Society

The field "Human Kinetics", does not empower our graduates with sufficient skills to tackle the societal challenges in human movement. The major achievement of the four-year programme is becoming PE teachers, fitness instructors or sports coaches/assistants over the years is faced with increases in required courses of over 50credits with fewer credits for our students' specific areas of specialization. Furthermore, the struggle to ensure our students have diverse knowledge in all essential disciplines affect our ability to deliver their professional competence and entrepreneurial skills needs.

The Way Forward

Mr. Vice Chancellor Sir,

There is a need for awareness and participatory role at all levels

- There is the need to restore movement behaviours at all levels such as home, school, workplace, social systems and the larger community. There is the need to ensure that all stakeholders, including lecturers, adhere to the 4-6pm Wednesday Recreation/Sports in University of Ilorin and not fix lectures at this period.
- This presentation is one of the numerous ways to educate professionals in Human Kinetics, policy makers and the general public about the actual need for us to widen our horizon using a holistic approach towards solving the current human movement.

- **Policy Modification**
  The existing policy on teaching/training of Human Kinetics professionals needs to be multidimensional and extended beyond the tertiary institutions (involving all stakeholders). A reorientation of the general populace may be a good point, to begin with.
- Engaging and utilizing the media effectively can promote and support wellness individually and collectively at workplace fitness centres, home or the community through voluntarism, empathetical approaches by being our brother's keeper.
- **New Curriculum**
  Professionals need to unitedly develop all the disciplines of human movement. Policy makers must urgently seek the inputs of all stakeholders including the government to develop and implement a wholesome curriculum beneficial to the discipline and for entrepreneurial opportunities for our graduates.

Reduction in Screen-based Activity

- Screen-based activities should be reduced and restricted to those beneficial to job and academic performance. Short breaks of 5-10minutes should be allowed at intervals of 30 minutes – 1 hour when long hours of work are necessary.

Salutations

I will bless the Lord God at all times and His praise shall be continually in my mouth. My heart rejoices in Him who has made everything beautiful for me. My Defender, I return all glory to you. Before all the people gathered here, I testify that only you have done this.

I want to express my heartfelt appreciation to my beloved parents-Late Pa Samuel Ogunsanya Fabinu who believed in my dream and supported me even when there were financial challenges to see the four-walls of academics; and my

mother, Felicia Omorinola Fabinu, who was always there to ensure her children's progress was never deterred by what she could provide, even to the extreme. Yeye mi o, wa jeun si ko to sun ninu Oluwa loruko Jesu (my mother, you will eat more fruits of your labour before resting in the Lord in Jesus name). The first seven years of my life with my parents laid the foundation for discipline of character and pursuit of excellence. My beloved parents (especially my mother) were intercessors who always stand in the gap to shield their children. Moomi, Yeye adura, Yeye-omo, yin a jeun si oloruko Jesu. My mother's caregiver, Mrs. Janet Gbonjubola, Olowolafe who has become part of the family. We are indeed grateful to you. I want to appreciate my only surviving Uncle, Appiah Fabinu for filling the gap left behind after losing four of his siblings within a year. God will sustain you for us all.

Words can not express my heartfelt appreciation to all my erudite teachers, mentors and colleagues at all stages of my academic life. Anglican Primary School, Ashanti New Town, Ghana, LEA Primary School Gwada-Minna especially Mr. Awodola, Mr. Ekeh, Mr.Oguro among others. Mrs. R. Isah (Late) and Mallam M. B. Ibraheem who were my Principal and my Physical Education Teacher respectively at Women Teachers' College, Minna,Niger State. All my Lecturers in Oyo State College of Education Ilesa, University of Ilorin and Ahmadu Bello University Zaria. To all my mentor-Professors and my Supervisory Committee at the Ahmadu Bello University, Zaria, Professor Venkarteswarlu (Late), Professor Chado (Retired),Professors J. A. Gwani, C. E. Dikki, and U. Gunen and every other amiable Professors and Lecturers for their contributions towards my Doctoral Programme. Othersare Professors Baba Ladan, (Mrs) F. B. Adeyanju, A.I. Kabido, (Mrs) T. N. Ogu, (Mrs) M.A. Suleiman, E. J. Chom, Musa Umaru and others whose names are not mentioned. May God bless your generations.

I want to specifically thank my Lecturers and Academic fathers in the University of Ilorin, Professors E. A. Ogunsakin,

A. A. Adesoye, O. O. Obiyemi, O. O. Oyerinde; Drs. Kola Lafinhan (Late), S. Bamigboye (Late).They taught me how to stand up for what is good no matter the challenge and to have a voice even when alone. To my Academic mentors in Exercise Physiology and Physical therapy, Prof. M. L. Emiola (Late) and Prof. A.E. Talabi who was my Supervisor at both Undergraduate and Master levels. To all other Colleagues in the Department, Drs. T. O. Ibraheem, S. T. Bakinde, Menumat T. Ajadi, S. B. Adebayo, M. G. Aina (who is currently the Assistant Director of Sports), Abdulraheem; and M. O. Ibraheem, S. A. Adeoye, Rofiat O. Dauda, and J. I. Kerimu, I say a big thank you. To all the past and present administrative staff members with whom we have worked together towards the uplifting of the Department and the University, I say thank you.

To My beloved Colleagues in our sister Department of Health Promotion and Environmental Health Education, working together with you before and after the split has been great; Professors O. A. Onifade, R. A. Shehu, O. L. Olaitan and S. O. Oniyangi, and the younger colleagues. Lastly, to the Head of Department, Prof. S. Sanusi for being there for me since he joined the University.

My appreciations go to all my Past Deans of Education, Professors M. L. Emiola, I. O. Idowu, E. A. Ogunsakin, R. A. Lawal, S. O. Olorundare, A. A. Adegoke, N. B. Oyedeji, Medinat A. Salman, Felicia A. O. William-Olasehinde, and my present Dean, Prof. M. O. Yusufas well as all Professors in the Faculty for your supports, mentorship and scholarly contributions over the years. My appreciation is also extended to all other academic colleagues and non-teaching staff in the Faculty of Education, University of Ilorin.

To all University of Ilorin Sports Council Board members: past and present Chairmen and Directors of Sports who gave me the platform to stand upon to add value to their laid down legacy. I say God bless your generations and my current chairman and beloved brother, Prof. G. Ijaiya, thanks for being there always. To all groundsmen, secretariat and technical staff

members, Mr. S. S. Sabonkudi(Ag. Stadium Manager), and Ag. Stadium Manager, Mr. A. O. Abdulraheem (Ag. Stadium Manager), my Chief Coach, Mr. Isah Olororo (Late) who we sadly lost to the hands of Death. May God preserve the family he left behind. Thank you all for your unflinching cooperation and loyal support. To the Baseball and Softball, Karate and Taekwando Sports Families, we shall accomplish our dreams.

To all University Staff and student-Athletes who have made the University a living legend; SUG Sports Secretaries; and the Student Union Leadership, Sports lovers in the University of Ilorin whose supports we have been enjoying and the University of Ilorin Media team. Thanks indeed! To the Directors and team members of Works Department, Physical Planning Unit, Legal Unit, Corporate Affairs Unit, Security Unit and the Estate Management team, I am really grateful for your selfless responses to my calls. God bless you all.

I also want to appreciate the Minister of Federal Ministry of Youth and Sports Development, Mr. Sunday Dare and the Directors of Grassroot Sports Development, Dr. Ademola Are (Retired but not tired) and Prince Durotoye for the Award for my contributions towards the successful hosting of National Youth Games and as Federal Government Nominee to 2019 All Africa Games in Morocco. I will forever be grateful for these privileges.

I want to also appreciate a special group of people who have been beloved friends in the background, chipping in positive words of advice, encouragement and commendations, Profs. Ajibade (DSA), Y. A. Quadri, R.A. Adeoye, W. B. Owoyele, Dr. Alex Akanmu, Director of Health Services, Dr. R. Odunola, Dr. R. O. Ogunade, L. A. Olatunji, Prof. Lawal(Agric.), Prof. Clement Bewaji, Prof. (Mrs.) Oladiji, Prof. Adimula and Prof. Luke Ayorinde (former DVC Academic).To all Committee members I have worked with within and outside the University, I say it hasbeen a great rapport.

To the Unilorin Christian Community, Staff Fellowship and Students Christian bodies. I give God the glory and pray He

will continue to water His church on campus and gates of Hell will not prevail in Jesus name. My appreciation goes to the past and present Venerables, Prof. Idowu, Ogundele, Mokolu, Dr. Osague and all others. To Pastor Olaosebikan, Prof. Olalere Adeyemi, Prof. Olorunmaiye, Prof. Babatunde (English); Patrons, Matrons and Staff Advisers, Prof. Olaoye, Prof. Mrs. Joseph, Prof. Ogunlade, Advisers and several others whose names are not mentioned. To Past and present Leaderships and members of Joint Departmental/Faculty Fellowships, Unilorin Christian Fellowship Association (UCFA) and Unilorin Christian Union (UCU).

I am also grateful to my Spiritual mentors and fathers, Pastor E. F. Oluwalowo (Late) and his wife who in 1985, led me on the path of spiritual warfare and all Men of God of Christ Apostolic Church in Minna Niger State; Evangelist Ojo Peters and Family of Voice of Mercy Ministries, Minna, Pastor Emmanuel (Late) Mrs. Nsah (Minna) Pastor and Mrs. Ogungbenjo, (Chairman, Grace Tabernacle DCC, Lagos) and other men of God and all elders at the District and DCC; Pastor and Mrs. Timothy Oyebode, Christ Apostolic Church, Ogbomoso, and several men of God whose names could not be mentioned with whom we have travelled on the journey of faith together. May we never miss heaven in Jesus name. I want to specially appreciate my Church Pastors here in Ilorin and His wife, Pastor (Dr.) Michael M. and Mrs. C. Ajiroba for standing by my family at all times; with Pastor David Folaranmi (Late) and Mummy Folaranmi and family; Reverend and Pastor Mrs. Egbeniyi of Life Builders Ministries, Ilorin for their parental support through thick and thin. To all members of Halleluyah Chapel, men and women; My Halleluyah Youths (past and present) including all executives, you are wonderful spiritual people! I want to also appreciate my parent's Pastor in IjebuJesa who always stand by the family at all times, Reverend and Mrs. Alabi of St. Peter's Anglican Church and the members who are always caring for my mother and the Bishop of the Diocese. We shall not miss eternity in Jesus name.

To the king of my town, Elegboro of Ijebu Jesa, His Royal Majesty, Oba Moses Olufemi Agunsoye, The Abikehin Ekun II for demonstrating good leadership and the progress of our community. The Ijebu Jesa descendant Unions for selflessly developing of our city-Alale Egboro a gbe a o (Amin).Our In-laws, His Royal Highness and Olori, Ayodele- of Ekerin-Opin. You are wonderful parents.

My appreciation also goes to the past Vice Chancellors, Prof. S. O. Abdulraheem, Prof. S. O. Amali, Prof. Ishaq Oloyede and Prof. Abdulganiyu Ambali who all have in one way or the other been a bridge from one level to the next to get to the last stop on the academic ladder.

My special thanks to the current Vice Chancellor, Professor Sulyman Age Abdulkareem. I became Director of Sports under his administration. He never knew I was not a man until the day I was introduced to him as the new Director of Sports. It has been a great experience with his uncompromising and excellent leadership. Mr. Vice Chancellor Sir, I want to specially thank you for your faith in me and for your unflinching support. May God bless the wife of the Vice Chancellor, Mrs. Abdulkareem for always being a good host and loving sister.

To the Deputy Vice Chancellors, Professors Sylvia. O. Molomo (Academics), B. F. Sule (Management Services), M. O. Buhari (RTI) who wonderfully bear me up on their shoulders. I also thank the Past Registrar Mr. E. D. Obafemi, the current Registrar, Dr. Fola M. Olowoleni for her sincerity and assertiveness and the University Bursar and her team for ensuring backups to our progress. Thank you all for your unflinching support and guidance.

I am grateful also to all my former and present undergraduate students for your love and submission towards holistic tutoring. My Postgraduate supervisees, Dr. Emmanuel Sarpong, my first Academic son, a Senior Lecturer in the University of Education, Winneba, Ghana, Dr. Benard Korsah (Late), whose death was sordid but his study on determining the Effect of Endorphin Release Therapy on Pain and Range of

Motion used to treat Injured Senior High School Athletes in Central Region, Ghana was a breakthrough. May God continue to comfort and preserve his family; Dr. Joseph Abolarin, a Senior Physical Education Teacher in Federal Government College, Efon-Alaaye; Dr. Ojo Israel Arogundade, a Lecturer in Redeemer's University, Ede; Dr. Hannah Idowu, a Lecturer in Niger State College of Education, Minna and Mrs Esther Whoba, Deputy Director in the Federal Capital Territory Sports Council, Abuja. Others include Adewale Adeoyewho is a lecturer in the Department of Human Kinetics Education, University of Ilorin, Ojo Nurudeen Abubakar, a Lecturer in Kogi State University, Ayingba, Japheth Kolawole Ayokanmi, Fitness Therapist at Abuja; Etchie Aboyowa Omokwa, Anim Stephen who are great teachers in Secondary Schools; Lieutenant Falore Julius and Major Muhammad Abdullahi Muhammad of the Nigerian Army, Ade Iornyor of Benue State University, Markurdi, Ibraheem Steven Itopa and my beloved Seidina Iliasu Yakubu, a tested and trusted academic son and mentee since his undergraduate. I am indeed grateful to you all and others I cannot mention for your contributions to my wealth of knowledge.

My Exercise and Sports Science Research International Group; especially Dr. Fatihaah O. Niyi-Odumosu a Senior Lecturer in Applied Human Physiology, University of the West of England, thank you for your efforts to ensure our collaboration yield fruits. I also thank other collaborators from Ghana, Dr. Edward Ansah, HOD and Senior Lecturer, Department of Health, Physical Education and Recreation, University of Cape Coast, Cape Coast; Dr. Yayra Kluiboto a Lecturer at the University of Education; Dr. Tony Danse, Senior Lecturer at Lagos State University and all other Research Collaborators and Research Assistants.

To all the Class of 1979 Set (Women Teachers' College, Minna); Class of 1983 Set(College of Education, Ilesa); Class of 1997 Set (University of Ilorin) and Master and Ph. D. Degrees classmates- I am proud of you all. May God spare our lives to eat the fruits of our labours.

I sincerely appreciate my elder sisters, Mrs. Hannah Omolayo Fabinu-Adewumi and Florence OmololaFabinu-Fayokun for their love, support and understanding. To my younger brother and sisters and their spouses, Engr. Isaac Olajide and Mrs. Samuel-Fabinu, Pastor and Mrs. Comfort O. Ajagbe, Pastor and Mrs. Simeon O. Fabinu, Mrs. Oluwatoyin and family, Pastor and Mrs. Roseline Olabode; Mr. Ayobami and Mrs. Fabinu, Engr. Moses and Mrs. Samuel-Fabinu; Amos and Babatunde Samuel Fabinu. It is wonderful having you around and available even when it seems there is no one to rely upon. All members of the Toobaase Clan and Fabinus, I appreciate you all.

I want to also appreciate my bond siblings and first cousins whom I grew up with as blood brothers and sisters, children of my father's immediate elder sister, Late Chief Mrs. Lydia Kayode-Ojo-Aunty Iyabo, Sister Lara Adedugbe, Aunty Iyadunni Osobu, Brother Tope Kayode –Ojo, Molayo, Ajibola and Ola Kayode-Ojo, nuclear and extended relatives, Nephews, Niece, to all the Oluwasemires, particularly Prof. Tunji Oluwasemire (University of Ibadan). Growing up with you and among you gave me the impetus to say, "I must strive to make it". The lessons kept me on my toes to pursue excellence within my level of understanding. I say a big thank you.

To all my bond sisters and brothers by marriage and their families, May God keep us and bless the fruits of our wombs in Jesus name. My spiritual and adopted children, God bless you.

To my beloved friends, Mrs. Kehinde Kolade-Johnson and family, The Oyaniyis, The Adeyemis, The Akinkoyes, The Daramolas, The Bolajis and others whose names escaped my mind while writing this. I apologise to those whose names are omitted.

My great and wonderful children- Deborah Oluwanifemi Ayodele (Nee Dominic), The Twins- Tolu and Tobi were there with me through thick and thin, even when it seemed there was no light, you stayed on the path with perseverance. I love you for

your doggedness, your tantrums and your resilience to ensure mummy is where she is today. Surely it might be so tough, I am sure you will get to your destined land in Jesus name.

I want you to appreciate my beloved and loving husband, my idol, a man who knows what he wants in life and what his passion is and pursued it without being intimidated. The man who gave me all the support I need to pursue my childhood dreams and vision even when it seemed it was over. Distance has never caused a gulf between us. I say "thank you".

Mr. Vice Chancellor Sir, I have come to the end of my Lecture and I return all glory to the Almighty God who made this day become a reality.

Take home charge:

'Your Life is Movement' 'Your Life's Positive Movement brings Positive Living'

'Move your body to Move your Life Onward and Forward

Move for Life.

Your Life is Livable by Moving your Body

Thanks for Listening and God Bless you.

References

Adeyanju, F. O. (2017).Physical Education, Sport and Gender: Beyond the Muscles. *An Inaugural Lecture at the Ahmadu Bello University, Zaria on Wednesday 26th July, 2017.*

Adolph K. E. Hoch, J. E. (2019). Motor Development: Embodied, Embedded, Enculturated, and Enabling. Annual Review of Psychology 2019 Jan 4;70:141-164. doi: 10.1146/annurev-psych-010418-102836. Epub 2018 Sep 26. PMID: 30256718; PMCID: PMC6320716.

American College of Sports Medicine (2021).*Exercise is medicine*. Retrieved October 10, 2021 from https://www.exerciseismedicine.org/about-eim/.

American College of Sports Medicine (2021).*Exercise is medicine on campus action guide.* Retrieved October 10, 2021 from https://www.exerciseismedicine.org/wp-content/uploads/2021/02/EIM-on-Campus-action-guide.pdf.

Arishel, M.H. (1990): Sports Psychology-Theory to Practice Scottsdale, Arisona. Gorsuch Scaribrick Publishers.

Association of Applied Sport Psychology (2020).About applied sport and rxercise psychology.https://appliedsportpsych.org/about/about-applied-sport-and-exercise-psychology/ retrieved on 16/10/2020.

Atarosta, W. (2001).Science of Human movements-meaning, name, directions of developmemt. *Journal of human Kinetics, 6:3-22.*

Australian Sports Commission(2019) Physical Literacy. Retrieved on 17/08/2019 from www.sportaus.gov.au/physical_literacy

Ayanniyi O., Udofia U.I. (2016). Prevalence and Pattern of Musculoskeletal Pain Among Undergraduates from a Nigerian University. African Journal of Physiotherapy and Rehabilitation Sciences 8(1 & 2), 28 – 37.

Bates, R. A., & Holton, E. F. III. (1995). Computerized performance monitoring: A review of human resource issues. *Human Resource Management Review, 5*(4), 267–288. https://doi.org/10.1016/1053-4822(95)90010-1.

Bergman, S.(2007). Management of musculoskeletal pain. Best Practices and Research in Clinical Rheumatology, 21(1):153-66. doi:10.1016/j.berh.2006.10.001. PMID: 17350550.

Bowman, K. (2017). Move your DNA: the difference between exercise and movement. Journal of Evolution and Health, 2(3), 1 – 16.

Brown, W.J., Williams, L., Ford, J.H., Ball, K., & Dobson, A. J. (2005).Identifying the energy gap: magnitude and determinants of 5-year weight gain in mid-age women. *Obesity Research*, 13(8), 1431 – 1441.

Canadian Sports Centres (2011). Canadian Sports for Life. Retrieved from http://www.canadiansportforlife.ca/ retrieved on 17/08/2019.

Collins Dictionary, (2021).Definition of play.Retrieved on from 20/08/2021https://www.collinsdictionary.com/dictionary/english/play..

Dominic O. L., Abolarin, J., Seidina, I. Y., Atikumi, N., & Ahmed, M. A. (2019). Influence of body composition on health status of civil servants in Efon Local Government of Ekiti State, Nigeria. *Russian Journal of Physical Education and Sports 14*(2),116 – 125.

Dominic, O. L. &Adu, J. (2018). Movement and African Child: A practice going Astray. *African Journal of Educational Studies in Mathematics and Sciences 14(1), 41-50*.

Dominic, O. L. (2002). The relationship between strength of the limbs and shooting of basketball players – A case study of Niger Potters Team.*Health and Fitness Journal International (HFJI).* 3(1), 34 – 42. Published by the Health and Fitness Association of Nigeria.

Dominic, O. L. (2006) Abdominal strength- endurance and shooting ability of Niger State basketball players of Nigeria. *Journal of International Council for Health, Physical Education, Recreation, Sports and Dance*, 1 (1).8-11.

Dominic, O. L. (2006). Functional sports study and practice: Teacher factor in its realization in the universal basic education scheme. J*ournal of Health Physical Education, Recreation, Sports and Dance,* 3(1):179-188.

Dominic, O. L. (2011). Strength-values in sports performance. *Journal of Research and in Health and Sports Science (JORHASS) 1, 124-133.*Published by the Department of Physical and Health Education, Bayero University, Kano.

Dominic, O. L., Adeoye, S. A., Kolawole, J. A., & Ibrahim, S. I. & Niyi-Odumosu, F. A. (2016). Appraisal of the facilities, equipment and fitness instructors in Fitness centres of Ilorin Metropolis, Kwara State, Nigeria. *Nigerian Association of Sports Science and Medicine. 17: 137-142.*

Dominic, O. L., Chado, M. A. &Gwani, J. A. (2018). Interplay among physical characteristics, position of play and shooting accuracy of elite female basketball players. *ACTIVE: Journal of Physical Education, Sports, Health and Recreation*, 7(2) 90-96. https://journal.unnes.ac.id/sju/index.php/peshr/issue/view/

Dominic, O. L., Ibraheem, T. O., Seidina, I. Y., &Niyi-Odumosu, F. A. (2017). Influence of ICT use on body composition and sedentary death syndrome (SeDS) risk among University of Ilorin sandwich students. *Kampala International University Journal of Social Sciences*, 3(1), 45 – 57.

Dominic, O. L., Seidina, I. Y., Niyi-Odumosu, F. A., &Owoyele, B. V. (2017).ICT use influence on activity pattern and body composition of university students in Kwara State.

Medicine & Science in Sports & Exercise 49(5S), 971. Available at: https://insights.ovid.com/medicine-science-sports-exercise/mespex/2017/05/001/ict-use-influence-activity-pattern-body/2848/00005768.

Dominic, O. L., Seidina, I. Y., Williams, D. F., Oyerinde, O. O., Olaitan 'L., Onifade, O. A. (2018). ICT use implications for exercise participation and health in the Nigerian university community. *Journal of Physical Education & Health 7*(11), 5 – 14.

Dominic, O. L., Seidina, I. Y., Williams, D. F., Oyerinde, O. O.,Olaitan 'L., Onifade, O. A. (2018).ICT use implications for exercise participation and health in the Nigerian University community. *Journal of Physical Education & Health 7*(11), 5 – 14.

Dominic, O. L., Talabi, A. E. & Niyi-Odumosu, F. A. (2016). Strength demands of Elite basketball shooting. Available online at: *Malaysian Journal of Sport Science and Recreation*, 12 (1), 5 – 13. *http://www.myjurnal.my/filebank/published_article/46912/2.pdf*.

Dominic, O. L., Talabi, A. E., Sarpong, E. O., Musa, M. O. Seidina, I. Y., Abubakar, N. O. &Bakinde, S.T. (2017). Making Weight for Sports Performance: Implications for Health of Combat Sport Athletes in Nigeria. *Ghana Journal of Health Physical Education, Recreation, Sports and Dance, 10, 90-112*.https://journal.ucc.edu.gh/index.php/gjohpersd

Dominic, O.L. (2005) Coaches' Communication Techniques and Athletes' Performance. Nigerian Journal of Sports Management 1(1) 39-48.

Edginton, C. R., Jordan, D. J., DeGraaf, D.G.,& Edginton, S. (1998)., "Leisure and Life Satisfaction: Foundational Perspectives" *Faculty Book Gallery*. 191.https://scholarworks.uni.edu/facbook/191. Retrieved 25/09/2021

Emiola,M. L. (2008). All Work and All Play: The Health Assurance in Exercise. An Inaugural Lecture delivered on 26th June at the University of Ilorin.

Eriksen, J., Sjogren, P., Ekholm, O., Rasmussen, N. K. (2004). Health care utilisation among individuals reporting long-term pain: an epidemiological study based on Danish National Health Surveys. *European Journal of Pain*, 8: 517–523.

Gjesdal, S., Ringdal, P.R., Haug, K., Maeland, J. G. (2004). Predictors of disability pension in long-term sickness absence: results from a population-based and prospective study in Norway 1994–1999. *European Journal of Public Health* ,14: 398–405.

Goffman, E. (1969) *The Presentation of the self in everyday life*. London. Allen Lane.

Goodway, J. D., Ozmun, J. C., &Gallahue, D. L. (2019). *Understanding Motor Development: Infants, children, adolescents, adults*. Burlington: Jones & Bartlett Learning, LLC.

Goossens, S., Wybouw, N., Van Leeuwen, T. &Dries Bonte, D. (2020). The physiology of movement. *Movement Ecology*, 8(5), 9-13 https://doi.org/10.1186/s40462-020-0192-2

Graven-Nielsen, T. & Arendt-Nielsen, L (2008). Impact of clinical and experimental pain on muscle strength and activity. C*urriculum Rheumatoid Report* 10:475–481.

Hall, S. J. (2012). Basic Biomechanics.(9th ed.), McGraw Hill, New York NY.

Hamill, J. H., Knutzen, K. M., & Derrick, T. R. (2015).Biomechanical basis of human movement.(4th ed.), Wolters Kulwer, Philadeiphia PA.

Hodges P. W. (2011). Pain and motor control: from the laboratory to rehabilitation. Journal of Electromyography Kinesiology, 21:220–228.

Hodges P. W. ,Smeets R. J. (2015). Interaction between pain, movement, and physical activity: short-term benefits,

long-term consequences, and targets for treatment. Clin J Pain 2015;31:97–107. [PubMed: 24709625]

Institute for the Public Understanding of the Pastand the Institute of Historical Research (2007). https://archives.history.ac.uk/1807commemorated/media/methods/performance.html 27/09/2021.

International Association for the Study of Pain(2021).*Musculoskeletal Pain*. Retrieved September 27, 2021 from https://www.iasp-pain.org/advocacy/global-year/musculoskeletal-pain/.

International Association of Physical Literacy (2017). Retrieved on 16/08/2019 from www.physical-literacy.org.uk

Iuliana, O. &Criveanu, M (2016). Organizational Performance – A Concept That Self-Seeks To Find ITSELF. Annals of the „Constantin Brâncuşi" University of TârguJiu, Economy Series, Issue 4, 179-184.

Jack, K,. McLean, S. M., Moffett, J. K, Gardiner, E.(2010). Barriers to treatment adherence in physiotherapy outpatient clinics: a systematic review. *Man Therapy* ;15:220–228.

Jones & Bartlett Learning; 8th edition (November 6, 2019)University Faculty Forum, 23/07/2019) http://www.lewisu.edu/experts/wordpress/index.php/what-can-you-do-with-a-degree-in-exercise-and-movement-science/

Kamran G. (2018). Physical benefits of (Salah) prayer - Strengthen the faith and fitness. *Journal of Novel Physiotherapy and Rehabilitation,* 2: 043-053. DOI: 10.29328/journal.jnpr.1001020.

Kirk, M. A.& Rhodes, R. E. (2011). Occupation Correlates of Adults' Participation in Leisure-Time Physical Activity: A Systematic Review. *American Journal of Preventive Medicine,* 20(4): 476-485.

Korsah, B. & DominicO. L. (2018).The Effect of Endorphin Release Therapy on Pains of Injured Shs Athletes in Central Region, Ghana. *Special Edition of Ilorin Journal*

of Health Physical Education and Recreation, 11(1), 36-41.

Landmark T, Romundstad P, Borchgrevink PC, Kaasa S, Dale O (2011) Associations between recreational exercise and chronic pain in the general population: Evidence from the HUNT 3 study. *Pain*, 152: 2241–2247.

Landmark, T., Romundstad, P. R., Borchgrevink, P. C., Kaasa, S, Dale, O. (2013) Longitudinal Associations between Exercise and Pain in the General Population - The HUNT Pain Study. PLoS ONE 8(6): e65279. doi:10.1371/journal.pone.0065279.

Landmark, T., Romundstad, P., Dale, O., Borchgrevink, P. C., &Kaasa, S. (2012). Estimating the prevalence of chronic pain: Validation of recall against longitudinal reporting (the HUNT pain study).*Pain* 153: 1368–1373.

Livni, E. (2017 September 9). The simple metaphor that's increasingly getting in the way of scientific progress**.**Retrieved on 23/07/2021.https://qz.com/1072039/the-simple-metaphor-thats-increasingly-getting-in-the-way-of-scientific-progress/

Logan, S. W., Kipling Webster, E., Getchell, N., Pfeiffer, K. A & Robinson, L. E. (Relationship between fundamental motor skill competence and physical activity during childhood and adolescence. A Systematic Review. *Konesiology Review*, 4 (4):416-426.

Loitz, C. (2013). The importance of lifelong Physical literacy. Alberta Centre for Active Living: Research and Education for the Promotion of Physical Activity. *WellSpring, 23(4),1-4.*

Lu, T., & Chang, C. (2012).Biomechanics of human movement and its clinical applications. Kaohsiung Journal of Medical Sciences 28, S13eS25.

Manchikanti, L., Singh, V., Datta, S., Cohen, S. P. & Hirsch, J. A. (2009).Comprehensive review of epidemiology,

scope, and impact of spinal pain. *Pain Physician* ,12: E35–70.

Mansilla, V. B. (2006). Interdisciplinary work at the frontier: An empirical examination of expert interdisciplinary epistemologies *Issues In Integrative Studies* No. 24, pp. 1-31.

Martin, B. I., Deyo, R. A., Mirza, S. K., Turner, J. A., Comstock, B.A, et al. (2008). Expenditures and health status among adults with back and neck problems. *JAMA* 299: 656–664.

Men's Journal (2021). House-hold Chores for Men Continue 2b (waw.mensjournal.com)

Menz, S. (2021).Star Therapies. https://starfishtherapies.com/motorsmartkids/ . 20/08/2021.

Merkle, S. L. Sluka, K. A., Frey-Law, L. A. (2020).The interaction between pain and movement. *Journal of Hand Therapy*, 33(1): 60–66. doi:10.1016/j.jht.2018.05.001.

Merriam Webster Dictionary, (2021).https://www.merriam-webster.com/dictionary/play Retrieved 20/08/2021.

National Cancer Institute (n.d.). *Mortality*. Retrieved October 20, 2021 from https://www.cancer.gov/publications/dictionaries/cancer-terms/def/mortality

Nesse, R. (2016). Arizona State University Centre for Evolution and Machine. *The body is not a machine.* Retrieved May 24, 2021 from https://evmed.asu.edu/blog/body-not-machine

Northwestern University (2021).*Wellness at Northwestern*. Retrieved October 10, 2021 from https://www.northwestern.edu/wellness/8-dimensions/physical-wellness.html

Ojo, I. A., Dominic, O. L., & Adeyemi, W. J. (2021).Eight Weeks Twenty Meters Walk Aerobic Exercise Improve Cardio-respiratory Fitness and Muscular Strength of

Stroke Survivor Outpatients in Tertiary Hospitals in Osogbo, Nigeria. *Journal of The Korean Society of Physical Medicine*, 16(2), 9–21. https://doi.org/10.13066/kspm.2021.16.2.9.

Oxford English Dictionary (2021) https://www.lexico.com retrieved 09/07/2021.

Rehman, R., Syed, S., Hussain, M., Shaikh, S. (2.013). Health and spirituality 'walk along' in wellness journey of medical students. J Pak Med Assoc 63(4), 495 – 500.

Salami, (2000). Contribution of physical education to schools sports. *Proceedings of first African Regional Conference ICHPER.SD* ,pp44-46.

Sandford F. M., Sanders T. A. B, Lewis J. S. (2017) Exploring experiences, barriers, and enablers to home- and class-based exercise in rotator cuff tendinopathy: a qualitative study.

Schechner, R. (1985) *Between Theatre and Anthropology*. Philadelphia. Pennsylvania University Press.

SHAPE America (2014). National PE Standards and grade-level Outcomes for K-12 physical Education a. Retrieved on 17/08/2019 from www.shapeamerica.org/standards.

Sharkov, F. & Silkin, V. V. (2020). Sociology of sports and the space of sports practices: social genesis and sociological theories. *RUDN Journal of Sociology,* 20(1): 137-144.DOI:10.22363/2313-2272-2020-20-1-137-144

Shields, M. & Tremblay, M. S. (2008). Sedentary behaviour and obesity. *Health Report 19*(2), 19 – 30.

Soda, I (March, 2012). Human Body – A Wonderful Machine(Lewis University Faculty Forum, 23/07/2019). What you can do with a degree in exercise and movement science. http://www.lewisu.edu/experts/wordpress/index.php/what-can-you-do-with-a-degree-in-exercise-and-movement-science/

Steeves, J. A., Tudor-Locke, C., Murphy, R. A., King, G. A., Fitzhugh, E. C. & Harris, T. B. (2015). Classification of occupational activity categories using accelerometry:

NHANES 2003–2004. *International Journal of Behaviour, Nutrition and Physical Activity,* 12(1):89.

Stewart, W. F., Ricci, J. A., Chee, E., Morganstein, D. & Lipton. R. (2003). Lost productive time and cost due to common pain conditions in the US workforce. JAMA 290: 2443–2454. 7

Talabi, A. E. (2016). Heaven is far – only the fit can make it. The one hundred and sixty-first inaugural lecture of the university of Ilorin. The library and publication committee, University of Ilorin, Ilorin, Nigeria.

The Australian parenting website (2021).Raising children Network. Household Chores for Children. https;//raising children.net.all. retrieved.09/02/2021)

The Full Life Study Bible (1992).edited by D. C. Stamps and J. W. Adams (Genesis 2:8-18).Publisher: Zondervan. Genesis 2:7-11

The Gleaner (2019): (household chores to give you great wornout) Published Wednesday; September 18,12:19am). https//Jamaica-gleaner.com/***

Thomas, J. R., & Nelson, J. K. (1990).Research Methods in Physical Activity.(2nd ed., new title for Introduction to Research in HPERD). Champaign, IL: Human Kinetics.

Tremblay, M. K., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Latimer-Cheung, A. E., …,Chinapaw, M. J. M. (2017). Sedentary Behaviour Research Network (SBRN) – terminology consensus project process and outcome. *International Journal of Behaviour, Nutrition and Physical Activity 14*(75), 1 – 17.

Tudor-Locke, C., Leonardi, C., Johnson, W. D., Katzmarzyk P.T. (2011). Time spent in physical activity and sedentary behaviours on the working day: the American time use survey. *Journal of Occupation and Environmental Medicine,* 53(12):1382–1387.

Turner, V.W. (1988) *The Anthropology of Performance*. New York. PAJ Publications.

UCDAVIS student health and counseling service (2019). https://shcs.ucdavis.edu/health-and-wellness/eight-dimensions-wellness#

University of Idaho (2021).Department of Movement Science, Faculty of Health and Human Science, College of Education. Retrieved on 21/10/2021.https://www.uidaho.edu/ed/mvsc.

Vogel (2021).Star Therapies.https://starfishtherapies.com/motorsmartkids/ . 20/08/2021

Whitehead, M. (2016) *The Value of Physical Literacy.* Available at: https://www.physical-literacy.org.uk/value-physical-literacy/ (Accessed: 21th September, 2021).

Whitehead, M. E. (2010). *Physical literacy: Throughout the life course*. London: Routledge.

World Health Organisation (2020).*Musculoskeletal conditions* retrieved September 27, 2021 from https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions.

World Health Organisation (2020).WHO guidelines on physical activity and sedentary behaviour. Geneva. Retrieved May 7, 2021 from https://www.who.int › Publications.

Zhang, X., Wenk, H. N., Honda C. N., Giesler, G. J. Jr. (2000). Locations of spinothalamic tract axons in cervical and thoracic spinal cord white matter in monkeys. *Journal of Neurophysiology*, 83:2869–2880.