Utilitarian Value of Mathematics in Sports Performance

Adetunji Abiola Olaoye & Ademola Onifade

Abstract

*The study examined the efficacy of knowledge of some mathematical concepts at the secondary school level and the successful execution of some sports skills that enhance the development of psychomotor domains of students. The study involved ten teachers comprising five mathematics teachers and five physical and health education teachers and four hundred students, chosen through simple random technique in five public secondary schools in Lagos State. Five research questions and two hypotheses were raised in the study at 5% level of significance. Instruments used were arrow and dart-board, spear, shot-put, javelin and discus for sports skills. C*ompass, *ruler and 40 multiple choice questions to identify mathematical concepts with a-20 item questionnaire to measure the utilitarian purpose of the identified topics. These instruments were thereafter given to senior colleagues in the Department of Physical and Health Education for compliance; and subsequently subjected to Spearman Rank method, which gave the coefficient of 0.69.* Findings *showed that there was a significant correlation between students' knowledge of 'angle of elevation and depression' and Darts (df = 198, r=0.962; P<0.05), there was a significant correlation between students' knowledge of 'loci' and 'Javelin Throw' (df = 198, r=0.080; P<0.05), there was a significant correlation between students' knowledge of 'Construction' and Shot put(df = 198, r=0.967; P<0.05), there was a significant correlation between students' knowledge of 'Bearings' and Discus Throw (df = 198, r=0.478; P<0.05), there was significant correlation in the performance of students among the identified sport skills namely Darts {df =(3,396), f-cal>f-val;P<0.05}, Javelin Throw {df =(3,396), f-cal>f-val;P<0.05}, Discus Throw {df =(3,396), f-cal>f-val;P<0.05}, and Shot put{df =(3,396), f-cal>f-val;P<0.05} though at variant. It was concluded that there is a relationship between mathematical concepts and sports skills.*

Key words: Utilitarian, Values, Mathematics, Sports, Performance

Introduction

Every subject in the school curriculum is important relative to the need of the society but some of these subjects seem to have been favoured in terms of their relevance to attain the set goals of the society. Mathematics is one of such subjects that have enjoyed government's attention going by the importance placed on science and technology in which the subject is a pre-requisite for its understanding. Teaching and learning of mathematics are so important that the objectives which the subject is expected to bring out have been delineated according to the nation educational system.

At the secondary school level especially the prominent objectives, according to Badmus(1997), include

(i) To generate interest in mathematics and to provide a solid foundation for everyday living

(ii) To develop computational skills;

(iii)To foster the desire and ability to be accurate to a degree relative to the problem at hand;

(iv)To develop and practise, logical and abstract thinking;

(v) To develop the ability to recognize problems and solve them with related mathematical language;

(vi)To provide necessary mathematical background for further education;

(vii) To stimulate and encourage creativity.

A close observation of the above-stated objectives reveals much expectation of the subject to an average citizen, as it goes beyond the cognitive level but the transformation of cognitive knowledge to a practical situation. Education is regarded as being dynamic when it is able to transform/develop its recipient from mere expectants to producers, and this is feasible when an individual is developed as an all round. Development of an all round implies the ability of an individual to make use of his potentials to solve problem at hand, and at the same time the solution should be utilitarian in nature. This is why many criticisms have trailed mathematics due to the high rate of failure of students' performances as corroborated by scholars like Odubunmi (2006) and Uwadiae (2009) who posited that 77% of the candidates that took part in the 2008 WASCE failed to get credit in some core subjects, mathematics inclusive. The worst was recorded in the 2009 National Examination Council, as revealed by Okpala(2010) that mere 1.8% of the candidates that sat for the examination had credit pass in five ordinary level results including mathematics.

On one hand one would have expected the students to have good performance in their final examination compared to the dismal outcome in spite of all efforts to make mathematics worthwhile, compared to other school subjects as emphasized by the Federal Government of Nigeria (NPE, 2006). On the other hand one might be forced to know the possible consequences of these dismal performances towards making the subject a utilitarian one. It is expected that what students learn should be transited towards the development of the nation. Based on the identified problem one is also

not sure if the mathematics teachers are transferring the topics they teach students into practical and real life situations. If mathematics teachers emphasize the transfer of mathematical skills into real life situations then mathematics skills should be able to perform one of its roles of the development of sports skills. This is more so in the biomechanical and kinesiological analysis of sports skills; and according to Lamb (1978) the application of the mathematical concepts in the performance of sports skills helps to study and understand the effects of natural laws and forces on the body when engaged in sporting activities. Cooper, Adrian and Glassow (1982) in support of this assertion argued that mathematical concept in sporting activities are relevant. They argued further that kinesiology which is a science of motion deals with the understanding of the interrelationships of the structure and functions of the body of human beings. To better understand these interrelationships, knowledge of mathematics among others is required. Consequently a study of this nature would bring to the fore the clear and unambiguous interrelationships between mathematics and sports performance.

Theoretical framework of Sport skills and Mathematical concepts in relation to Utilitarianism

Event is said to be utilitarian when its attribute could be used in solving a related practical problem as it arises. One of the cardinal objectives of teaching and learning of mathematics is to develop the learner's muscular potential which domicile in psychomotor domain (Norton, 1984). This is more the reason why different content areas of the subject have consistently been emphasized by the curriculum planner to mathematics teachers. There are different sports in all human endeavours but the selection of 'Dart, Javelin, Short Put and Discus throw' were employed as the techniques are embedded in some mathematical concepts namely angle of elevation and depression, bearing, longitude and latitude, and construction with loci.

Darts-Darts can be described as a target sport in which players throw small, arrow-like, weighted missiles, called darts, at a round board hanging, most usually, on a wall. Throwers alternate and each player throws three darts per turn from a specified distance to get a total score of 501 or 301points depending on the rules. The numbers 1 to 20 are arranged around the dartboard with 20 being the highest number, vertically above the bull. Throwers can double any score by getting their darts into the smaller circle and score a triple if they hit the even smaller inner circle. The

highest score which a thrower can score in a traditional three-dart throw is 180 but if a competitor hits the centre he or she scores 50, with the outer-bull area scoring 25. Darts are usually about 15 cm long with tips of steel or tungsten. The relationship between darts throw and angle of elevation and depression is to measure the extent of eye and hand coordination as the topic emphasised in the school curriculum

Javelin Throw-The javelin is a steel-tipped metal spear with a minimum length and weight of (260 cm and 800g) and (220 cm and 600g) for men and women respectively. It has a whipcord grip which is about 15 cm (6 in) long and located at the centre of gravity. The javelin must be held at the grip and released before the athlete crosses the end of the runway, but the angle at which the javelin is launched is crucial, because too high or low a trajectory causes the javelin to lose distance. Every thrower's foot is planted firmly on the ground as needed strength is clearly shown in the tautness of arm muscles.

With two parallel lines specifically 4 m apart that marks the javelin runway, the scratch line is a 7cm wide strip, which is sunk flush in the ground and touches the front ends of the runway lines. The centre of this strip is equidistant and located between the runway lines. From this centre point, two straight lines extend through the ends of the scratch line for a distance of 90 m where all throws must land.

In most cases, throws are measured on a direct line from the point of impact to the centre, but only the distance to the inner edge of the arc is recorded. Throwers must stay within the runway and not touch the scratch line as javelin land with tip first. Throwers get three throws, but the best throwers are given three more while others are placed according to their best throws. In contrast, the throw is disallowed if they step across the line or if the javelin does not fall to earth point first. The best practice in mathematics to ensure skilful throw of Javelin lies in the concept of construction with loci.

Shot-put-Shot put is a sport that makes use of a solid metal ball through the air for a maximum distance that are gender wise: the men's shot weighs 7.26 kg and the women's shot weighs 4 kg but the action in shot-putting is confined to a circle of 2.1 m in diameter. The athlete holds the shot in the fingers of the throwing hand and rests the hand against the shoulder with the shot under the chin. Thrower hops across the circle in a half crouch, building up speed and upon reaching the opposite side of the circle, straightens suddenly and puts the shot with an explosive force while uncoiling

the arm and body. The shot is often pushed into the air, and not thrown, while the put must be made from the shoulder with one arm only, the shot must not be brought behind the shoulder. Each participant gets three throws, and the best ones are given three more throws. Measurement is from the point of impact of the shot to the inside of the circumference of the putting circle on a straight line which carried through the centre of the circle. While participants are ranked according to the distance of their longest throw, the contestant that steps outside the circle of the throw is disqualified. The practice of the game could best be enhanced through proper teaching and learning loci in mathematics that emphasize greater training of the muscle system.

Discus Throw-Discus Throw is also body fitted sport which involves athletes entering a small circle in which they spin around and release the discus, which is a metal or wood disc with a whip-like arm motion. Discus throws are measured from the point of impact of the discus to front of the throwing circle. As steel-rimmed hardwood or metal platter that is thrown from a circle 2.5 m men's discus measures from 219 to 221 mm across and 44 to 46 mm in thickness though it weighs 2 kg. On the other hand, women 's dimensions are 180 to 182 mm across, 37 to 39 mm in thickness and weight of 1 kg. The athlete holds the discus flat against the palm and forearm of the throwing, then whirls around rapidly and propels the discus outward with a whipping motion of the arm.

The circle is marked off by a metal rim or white line with two straight lines extending from the centre of the circle at an angle 90, and all legal throws land in the area between these lines. As soon as athletes enter the circle and begin a throw, they must not touch the ground outside the circle until the discus has landed. Throws are measured from the point of impact to the inside of circumference of the circle, on a straight line through the centre of the circle. Each competitor gets three throws, after which the best throwers are given three throws. All throws are counted, and the athletes are placed according to their longest throw**.** The appropriate concept to make the discus throw plausible lies in the understanding of bearings with loci inclusive. This was part of rationale to establish the extent to which students taught these concepts could perform in the identified games, and as assessed by the experts.

Bearings-Bearings can be described as the direction of an object from an observer or from another object, and it is measured as a horizontal angle in relation to north. Most at times it is measured clockwise from north, designated as 0°. Though the concept

seems to be complicated by the existence of different interpretations of north, as the true bearing relates to the direction of the North Pole (real north) as measuring bearings from maps is more usual to use the north-south grid lines which are printed on most topographic maps. Nevertheless, the map projection is used and this grid north in most cases do not coincide with the direction of real north, save along the central meridian of the projection. Map bearings are usually measured in relation to grid north with compass making use of magnetic north. This is the direction of the north magnetic pole that attracts the north-seeking end of the compass needle, though position changes through time.

In the neighbourhood of navigation it is always important to convert magnetic /compass bearings to grid/map bearings and vice versa. To ascertain this one needs to consult the margin of the map for information on the difference between grid and magnetic north, as well as the rate and direction of change of the latter.

The bearing is measured in degrees of 360° in a circle Bearings are made use in some countries via grads or grades, which is 400 to a circle and for the military purposes, mils are often used to represent 6,400 to a circle.

Loci-The concept of loci is best illustrated along with construction of any shape in Mathematics. The construction could be triangle, rectangle just to mention a few but in common usage, locus (i.e. singular of loci) refers to the line that bends continuously and smoothly without angles, but distinguished from straight or broken lines. In mathematics, however, a locus is a line that could also be a curve.

In a branch of mathematics called analytic geometry a loci/curve is defined as the points in the coordinate system that satisfy a definite set of conditions. e.g, a circle is a curve which specifies the loci of all points in the plane that are equidistant from a fixed point called the centre. Similarly, the graph of a defined function can also be described as a curve. In some cases, the intersection of two surfaces that produces a curve, and the path of a moving point also describes a curve.

Statement of the problem

The study examined knowledge of some mathematical concepts at the secondary school levels and some sports skills that enhance the development of psychomotor domains of students. The study showed to what extent some of the identified concepts in mathematics could enhance sport skills performance of students relative to other students that were not taught the relationship of theory and practice and this is why it

sought to answer stated research questions: Is there a relationship between students' pre-knowledge of the mathematics concepts and performance in sport skills, relationship between students' knowledge of 'angle of elevation and depression' and darts, relationship between students' knowledge of 'loci' and javelin throw, relationship between students' knowledge of 'Construction' and shot put, relationship between students' knowledge of 'bearings' and discus throw, and utilitarian relationship of the identified mathematical concepts and sport skills performance others. Specifically, the study examined the relationship between some mathematical concepts and performance in some sports skills

Methodology

The study correlated the knowledge acquisition in some mathematical concepts to practice and application in real life situation, which is one of the cardinal objectives of teaching and learning of mathematics at the secondary school level

Population and Sample

Population of the study included all the physical & health education and mathematics teachers including senior secondary 2 students in the selected public secondary schools in Lagos State. Out of all the available schools four (4) were selected through purposive sampling techniques based on proximity with the schools as well as willingness of subjects to participate in the study. The physical and health education teachers monitored the performances of the students to comply with the rules and regulation of the chosen sports while the mathematics teachers ensured proper application of the concept taught scored the students and the knowledge attainment.

Instruments

The sports' instrument included arrow and dart-board, spear, javelin, shot-put and discus to measure sports skills. Compass, rulers and 40 multiple choice questions adapted from Senior Secondary Certificate Examination (SSCE) past questions to test the knowledge acquisition in the identified mathematical concepts. A-twenty (20) item questionnaire was also developed to measure the utilitarian knowledge of the identified topics in sport skills. The construction of the 50 multiple choice questions achievement test was carried out through the assistance of two secondary school mathematics teachers using the ordinary level syllabus, and physical and health education teacher to ensure that the contents have relationship with the expected sports skills. This instrument was thereafter given to senior colleagues in the department of physical and health education, and the edited version was trial tested on

twenty students to correct any ambiguities that might arise, and thereafter re-presented to the same set of students, though outside the main study but true representative of the actual students that were used. The exercise was done within an interval of three weeks in order to forestall the possible interference of the previous administration. At the end, a-forty (40) item multiple choice questions were developed based on the experts' input. The results obtained from the tested multiple choice questionnaire in the first and second administration to the selected ten students were correlated with the use of Spearman Rank correlation method, which eventually gave the coefficient of 0.69, which established the reliability of the instrument. The scoring on the achievement test is a minimum of 20 points when a student is taken to have acquired the knowledge of the sports skills. Scoring of sports skills was executed by the Physical and Health Education teacher based on the distance covered by each student on the throw of javelin and shot put, for instance, and these scores were transformed into percentages and used to correlate those scores in the mathematical concepts identified.

Administration of the instruments and Data Analysis

Prior to the administration of the instruments each mathematics teacher was mandated to execute an intensive four weeks lesson on different topics already mapped-out for the execution of the identified sports' skills. Simultaneously the physical and health education teachers were briefed on the relationship between mathematical concepts and the sports' skills. In the fifth week the students were moved to the pitch to demonstrate what they had learnt in mathematics. The sixth week was used by the mathematics teachers to conduct test and mark the test using the achievement test. Data collections were strictly based on the manner of the administration as reported by the both mathematics and physical and health education teachers' assistants. The score of each student in the mathematics achievement test was correlated with score obtained on sport's skill tested. The scoring was standardized to 100 percent for easy computation and reference purpose. The scoring of each sport's skill was done by the physical and health education teacher, and thereafter turned it into a standard score of percentage while the achievement test was scored by the mathematics teachers using the guide provided by the researchers for the test. Each correct and wrong answer attracted one and zero mark respectively. Data was analyzed with the use of simple

descriptive statistics, correlations and one-way ANOVA at 0.05 level of significant to answer the questions of the study.

Findings and Results

RQ_1: What is the correlation between students' pre-knowledge of the mathematics concepts and identified sports?

Table 1: **Correlation Coefficient of students' knowledge in mathematics concepts and sports performance**

Variations	Count	Mean (%)	Standard Deviation	Correlations	Remarks
Pre-knowledge of the Mathematics concepts	400	46.21	13.43		
Knowledge of the Sports skills	400	41.89	19.75	0.957	Very Strong

Table 1 reveals a relationship of students' knowledge of the identified mathematics concepts and the performances in the sports skills as scored by specialist in the area of physical and health education of the selected schools. Students had the mean scores of 46.21 and 41.89 in the mathematics concepts and sports performances, respectively, and strong correlation of r = 0.957. This demonstrates that positive results in the knowledge of mathematics concepts translated to their corresponding positive results in sports performances and vice-versa. By implication the more mathematics teacher develops these concepts in relation to these games and other related ones the more skilful the students are likely to perform.

RQ_2: What is the correlation between students' knowledge of 'angle of elevation and depression' and darts?

Table 2: **Correlation Coefficient of students' knowledge of 'angle of elevation and depression' and Darts skills**

Variations	Count	Mean (%)	Standard Deviation	Correlations	Remarks
Knowledge of 'Angle of Elevation & Depression	100	46.77	9.72		
Performance in Darts	100	39.60	14.98	0.962	Very Strong

Table 2 shows the relationship of students' knowledge of 'angle of elevation and depression' and performance in 'darts' as revealed by the students. Students had mean score of 46.77 and 39.60 in angle of elevation and depression, and darts, respectively, and strong correlation of r = 0.962. This shows that the more meaningful teaching and interrelationship of this mathematical concept so is the skilful performance of the students in dart, and vice-versa.

This informs mathematics teachers to develop this concept in relation to darts and other related ones in order to ensure better performance in sports.

RQ_3: What is the correlation between students' knowledge of 'loci' and javelins throw?

Table 3: **Correlation Coefficient of students' knowledge of 'loci' and javelin throw' performance**

Variations	Count	Mean (%)	Standard Deviation	Correlations	Remarks
Knowledge of 'loci,	100	60.34	11.10		
Performance in 'Javelin Throws'	100	39.35	24.33	0.080	Very Weak

Table 3 shows the relationship of students' knowledge of 'loci' and 'javelin throw' as revealed by the students. Although students had mean score of 60.34 and 39.35 in loci and javelin throws, respectively, yet there was a weak correlation of 0.080. This shows that positive results in the knowledge of 'loci' did not translate to corresponding positive results in 'javelin throw' and vice-versa. The implication of this finding is that there was no meaningful relationship between knowledge of loci and performance in javelin throws. However, finding does not rule out the possibility of other mathematical concept to the javelin throws if administers in the same setting.

RQ_4: What is the correlation between students' knowledge of 'Construction' and Shot put?

Table 4: **Correlation Coefficient of students' knowledge of 'Construction' and Shot-put' performance**

Variations	Count	Mean (%)	Standard Deviation	Correlations	Remarks
Knowledge of 'Construction'	100	37.38	18.38		
Performance in 'Shot-put'	100	44.73	13.81	0.967	Very Strong

Table 4 shows the relationship of students' knowledge of 'construction' and 'shot put' as demonstrated by the students. Although students had a poor mean score of 37.38 and 44.73 in the 'construction' and 'shot put' respectively yet there was a strong correlation of mean scores of 0.967. This shows that positive results in the knowledge of 'construction' translated to their corresponding positive results in 'shot put' and vice-versa. The implication of this finding is that the more mathematics teacher develops this concept in relation to this game and other related ones the more skilful the students are likely to perform.

RQ_5: What is the correlation between students' knowledge of 'bearings' and discus throw?

Table 5: **Correlation Coefficient of students' knowledge of 'bearings' and discus throw' performance**

Variations	Count	Mean (%)	Standard Deviation	Correlations	Remarks
Knowledge of 'Bearing'	100	40.65	64.43		
Performance in 'Discus-Throw'	100	44.73	13.83	0.478	Weak

Table 5 shows the relationship of students' knowledge of 'bearings' and 'discus throw' as demonstrated by the students. Though students had the mean score of 40.65 and 44.73 in bearing and discus throws, respectively, the coefficient of 0.478 shows there was a weak correlation. This shows that positive results in the knowledge of 'bearing' could translate to their corresponding positive results in 'discus throws' and vice-versa. The implication of this finding is that mathematics teachers should aim at developing this concept in relation to the sport skill and other related ones that make students perform better.

Ho_1: There is no significant correlation of utilitarian value of the identified mathematics concepts and the games.

Table 6: Correlation coefficient of utilitarian value of the identified mathematics concepts and sport skills

Variations	Count	Mean (%)	Deviation	df	Correlation	Significant
Utilitarian purpose	400	54.61	12.98	399		
Post-sport skills	400	48.19	13.96	399	0.324	P<0.05*
Total	800	-	-	798		

* Significant

On the consideration of students' response to the utilitarian relationship in the identified mathematics concepts and sports through post-sports measured, it was observed that there was a significant utilitarian correlation in the identified mathematics concepts and the sports performance ($df = 798, r = 0.324$; $P<0.05$). Although students had varying mean scores in the mathematical concepts and corresponding sports skills, yet the more mathematics teachers could strive to develop these concepts in relation to these sports skills and other related ones the more skilful the students are likely to perform.

Ho_2: There is no significant difference in the performance of students among the identified sports.

Table 7: One way Analysis of Variance of students' performances in the identified Sports' Skills

Variations	Sum of Square	Mean Square	df	Concept	f-cal	f-val	Significant
Btw group	18372.05	6124.02	3				
Within group	66893.87	168.92	396	Darts	36.25	P<0.05*	
Total	85265.91	-	399				
Btw group	26038.38	28421.97	3				
Within group	210192.62	530.79	396	Javelin-	53.55	P<0.05*	
Total	236231.00	-	399	Throw	2.370		
Btw group	2431.81	810.60	3				
Within group	73855.36	186.50	396	Discus-	4.35	P<0.05*	
Total	76287.17	-	399	Throw			
Btw group	4431.81	1477.27	3				
Within group	73855.36	186.5	396	Shot put	7.92	P<0.05*	
Total	76287.19	-	399				

* Significance

Table 7 reveals that there was significant difference in the performance of students among the identified sports namely darts {df =(3,396), f-cal>f-val;P<0.05}, javelin throw {df =(3,396), f-cal>f-val;P<0.05}, discus throw {df =(3,396), f-cal>f-val;P<0.05}, and shot put{df =(3,396), f-cal>f-val;P<0.05}. Infact, the level of significance of these sports skills were found to be significant than others where javelin throw had the highest and discus throw with the least but on the whole these sports skills had significant relationship to the mathematical concepts taught. The immediate implication of this finding is that significant differences observed in the performance of students in these sports might not be unconnected with the varying methods by which their physical and health education teachers handle their teaching to make these students see to the inter-relationship. The prospective teacher of mathematics probably failed to make them appreciate the inter-relationship of the topics taught on one hand, and the accumulated mathematical knowledge when transferred into reality in general.

Discussions

Mathematics is a life subject when one appreciates its relative importance to real life situation, provided that those that are entrusted with the use of the figures actually do the right thing at the right time. This implies that the teaching of mathematics goes beyond the cognitive domain for which it is presently skewed towards, which make

students not to see clear relation of the knowledge in mathematics to their immediate need in the society. However what one could say about the dismal performance may be inadequate close relationship of this topic to the identified game on one hand, and the students' preparedness to apply what they had learnt in the classroom of mathematics to practice the game. Apart from that students' attitudes could change over time if they could be allowed to see and understand the relationship between what they had learnt cognitively and what they could apply it for in a real life situation. This in turn would make the learning of mathematics functional as compared to when they learn something not in relation to what they could apply it for in the society. On the whole these sports skills had significant relationship to the mathematical concepts taught but immediate implication of this finding is that significant differences observed in the performance of students in these sports might not be unconnected with the varying methods by which their physical and health education teachers handle their teaching to make these students see to the inter-relationship. The prospective teacher of mathematics probably failed to make them appreciate the inter-relationship of the topics taught on one hand, and the accumulated mathematical knowledge when transferred into reality in general.

Also, study found that in spite of the low performances of students in 'angle of elevation and depression' and 'darts' there was a relationship between students' knowledge of 'angle of elevation and depression' and darts performance ($df = 198$, $r = 0.848$; $P<0.05$). This demonstrates that an enhanced knowledge of 'angle of elevation and depression' could be used to stimulate activity in 'darts'. Secondly, findings revealed students' performances in the loci and javelin throw with varying mean scores of students in the two constructs where performance in loci compared to javelin throw, and yet there was a significant relationship between students' knowledge of 'loci' and 'javelin throw' performance ($df = 198$, $r = 0.755$; $P<0.05$). This demonstrates that an enhanced knowledge of 'angle of elevation and depression' could be used to stimulate better knowledge of 'darts'. Furthermore, students' knowledge of 'Construction' could enhance their performance in 'Shot pot' was observed that there was a relationship between students' knowledge of 'Construction' and Shot put performance ($df = 198$, $r = 0.852$; $P<0.05$). As earlier reiterated one could observe that the more knowledge students had in these mathematical concepts so were the translation into the sport activities even though at low level. This is to say

that the more the teaching and learning of these concepts relatively to these sport activities, the more enhanced is students' knowledge of skill of shot put. Also, finding showed that students' knowledge of 'bearings' and 'discus throw' revealed that there was no relationship between students' knowledge of 'bearings' and discus throw'. Students seemed not have seen any correlation between this topic and the identified sport skills or that the teaching was not done to capture the use of knowledge of this topic in the game.

Findings revealed a strong correlation of knowledge of elevation and depression, and darts performance that corroborated the opinion of Santos & Ken (1991) on adequate knowledge of concepts to a real practical one in sports skills. Apart from that, it is possible that not all the people could have time for one sport activity or the other, so far one has passed through the formal education system where mathematics is one of the core subjects then the knowledge gained could be used to develop other aspects of one life provided those that teach the subject make it real to the learners. This assertion is in contrast with the findings of knowledge of loci in mathematics and practice of Javelin Throw that revealed a weak relation, and in contrast to Carr (1999) assertions of relationship. Infact, study showed a strong relationship of knowledge of construction and shot-put skills, which Burfoot(1997) believes as an antecedent to the other. Similarly, it could be inferred that not until the teaching and learning of mathematics are practically demonstrated to the immediate activities that one could say the learning situation is functional as opposed to regurgitation approach. Study revealed a weak correlation of knowledge of Bearing on the discus-throw skills, and this is not in line with the assertion of Rosen (1994) that such acquired knowledge ought to have brought out exemplary performance in sport skills.

Conclusion and Implications

From the findings of the study, there is a relationship between students' knowledge of identified mathematics concepts and sports' skills. There is also a relationship between students' knowledge of loci, construction, bearing, angle of elevation and depression, and performance in javelin, dart, shot put and discus. A utilitarian relationship exists between identified mathematics concepts and sport skills' performance. There is no intra difference in mathematics concepts and sport skills' performance. Although there are three domains in any human which the school subjects are expected to maximize to the fullest so that each and everyone could

contribute ones quota to the development of the society. In some situations many students would have developed phobia for the learning of mathematics by not knowing that other aspect of life could be integrated through the subject. Furthermore, it makes the learning of mathematics boring to the students who might feel that the subject has nothing to offer them instead of committing many things into their brain without much application. This might stagnate pace of development which science and technology could offer via the proper language of mathematics that has been considered as threat to students, could have excelled in the subject but not showing interest in its learning.

Recommendation

Mathematics is a pragmatic subject relatively to the understanding of those who really make use of its branches in life. As a result it behoves on mathematics teachers to see the subject beyond mere teaching to pass a prescribed examination but to make students functional in their own capacities. Acting in this way should open their eyes to relate the teaching of the subject to what students could use the learnt concept for in the overall development of mankind. Teachers should explore integrated approach to disseminate mathematical concepts to the students and within themselves brainstorm on the possible integration of mathematics topics to immediate activities to make students develop more interests in the subject.

References

Badmus, G.A. (1997) 'Mathematics Education in Nigeria' *Science Mathematics and Technology Education in Nigeria Proceedings of the 11th Annual Congress of Nigerian Academy of Education*

Burfoot, Amby, (1997). *Runner's World Complete Book of Running: Everything You Need to Know to Run for Fun, Fitness, and Competition.* Rodale Comprehensive guide.

Carr, Gerald A.(1999). *Fundamentals of Track and Field.* Human Kinetics, Introduction to the events and training for students' athletes, their parents, and coaches. 2nd ed.

Cooper, J.M; Adrian, M. & Glassow, P.B.(1982) Kinesiology St Louis: The C.V Mosby Company

Federal Ministry of Education (2006) *National Policy on Education*, NERDC, Yaba Lagos

Lamb, D.R.(1978) Physiology of Exercise Responses and Adaptations. New-York Macmillan Publishing Co, Inc.

Norton, F.G.J.(1984) Ordinary level Mathematics L' Harwood-Clarke, sixth edition, Heinemann Educational Book, London.

Odubunmi E.O.(2006) Science and Technology Education in Nigeria: The Euphoria, the frustration and the hopes. *21st Inaugural Lecture series of Lagos State University, Nigeria*

Okpala, Promise (2010), NECO releases 2009 SSCE results, only 1.8% passed, BUSINESS DAY, March 17th Page 4

Senior School Certificate Examination (SSCE) *Past Questions and Answers (For SSCE, GCE & NECO) Mathematics (Theory/Objectives),* Johnson Publishers Ltd, Lagos

Rosen, Mel, and Karen Rosen(1994). *Sports Illustrated Track: Championship Running.* Sports Illustrated

Santos, Jim, and Ken Shannon(1991). *Sports Illustrated Track: The Field Events.* Sports Illustrated Basics of jumping, pole vaulting, shot put, and more.

Uwadiae, Iyi (2009) '77% of WAEC candidates failed to get credit passes in Mathematics-FG sets up panel to debate report' National News in *The Punch Newspaper* of Monday, March 2, page 10

Acknowledgements

Researchers seize this opportunity to acknowledge the use of Encarta Encyclopaedia Standard (2005) of Microsoft Copyrights in the aspect of conceptual framework on Sports; and the cooperation of the teachers, students and schools' authorities used for the study.

(1)Dr Olaoye is a Senior Lecturer in Mathematics Education (2) Prof Onifade is a Professor of Sports Administration and Psychology