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An Evaluation of the Influence of Pupils' Physiological Needs Satisfaction on Academic Performance of Public Primary Schools in Eastern Zone of Nakuru Municipality, Kenya

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***Abstract**: This study investigated the influence of physiological needs on academic performance in public primary schools of the Eastern Zone of Nakuru Municipality. The study used survey research design to establish the influence of adequate nutrition, adequate water, adequate sleep, and family well-being on academic performance of class 8 pupils in the area of study. The study target population was 800. 370 respondents were chosen for the study through systematic random sampling. Response rate to the questionnaire administered stood at 72%. Descriptive statistics were used to present the data and one way ANOVA was used to analyze the influence of the independent on the dependent variables. Provision of adequate nutrition, provision of adequate water and the feeling that one's needs were met at the family level signed influence on academic performance. The study concluded that though Maslow's theory of hierarchy of needs gave valuable insight on the role that meeting physiological needs played on academic performance it was not completely adequate in explaining why some pupils who were physiologically deprived still ended up performing well in examinations. The outcome of this study could be instrumental in instructing intervention measures by the Ministry of Education in implementing learning programmes in deprived schools.*

I. Introduction

This chapter is an overview of the research study on an evaluation of pupils' physiological needs satisfaction on academic performance of public primary schools in the eastern zone of Nakuru municipality, Kenya. It comprises of the background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, scope of the study, assumptions of the study, limitations of the study, and definition of significant terms used in the thesis.

Background of the Study

I t has frequently been observed that the quality of learning, as measured by learning outcomes, has tended to be low in the rural area schools and in schools in informal settlements. Other than the presence of inadequate resource supplies in the schools, most of the pupils in these schools have come from families that socio-economically disempowered. Socio-economic disempowerment has in its part interfered with the ability of household to meet basic human needs of their children (Jyoti, Frongillo, & Jones ,2005; Kudzai, 2013).

Using longitudinal data to investigate how food insecurity over time related to changes in reading and mathematics test performance, weight and BMI, and social skills in children, Jyoti, Frongillo, and Jones (2005) found that food insecurity was predictive of poor developmental trajectories in children before controlling for other variables. Food insecurity thus serves as an important marker for identifying children who fare worse in terms of subsequent development. Their study strong empirical evidence that food insecurity is linked to specific developmental consequences for children, and that these consequences may translate into diminished academic performance.

Sleep quality, on its part has been found to have significant effects on cognitive performance and is influenced by multiple factors such as stress. In a study by Ahrberg, Dresler, Niedermaier, Steiger, and Genzel (2012) among medical students in the United States of America it was found that contrary to the ideal, medical students and residents suffered from sleep deprivation and stress at times when they should achieve the greatest amount of learning. In their study, seeking to examine the relationship between sleep quality and academic performance, 144 medical students undertaking the pre-clinical board exam answered a survey regarding their subjective sleep quality (Pittsburgh sleep quality index, PSQI), grades and subjective stress for three different time points: semester, pre- and post-exam. Academic performance correlated with stress and sleep quality pre-exam (r¼0.276,<0.001 andr¼0.158,p<0.03, note that low performance meant low sleep quality and high stress), however not with the stress or sleep quality during the semester and post-exam. 59% of all participants exhibited clinically relevant sleep disturbances (PSQI>5) during exam preparation compared to 29% during the semester and 8% post-exam. The study showed that in medical students it is not the generally poor sleepers, who perform worse in the medical board exams. Instead students who will perform worse on their exams seem to be more

stressed and suffer from poor sleep quality. However, poor sleep quality may negatively impact test performance as well, creating a vicious circle.

Kudzai (2013) while studying the psychological effects of poverty on the academic performance of the girl- child in Zimbabwe, noted that the relationship between poverty, the psychosocial development, and the academic performance of the girl child is far from simple and direct, and is much more complicated than merely the effects of poverty alone. She however found that there was a high incidence of failure rates among pupils who came from poor backgrounds than those who came from the higher end of society.

Despite the progress noted in the reduction of absolute poverty levels across the world, Sub-Saharan Africa still falters under the heavy load of households living under the poverty line (UN MDG Report 2011), and consequent inability to meet the basic physiological needs of their families. Though absolute poverty declined from 52.2% in 1997 to about 46.0% in 2005/06 in Kenya, significant variation in poverty levels still exists among the 210 geo – political areas. In the former Rift Valley Province, poverty incidence increased marginally from 47.9% in 1999 – 48.7% in 2005/06. The 49 constituencies in the province contributed 25.6% of the total national poverty with an estimated 4.24 million poor people. In Nakuru town constituency, with a population of about 258,848, poverty is rated at 45%. Its national poverty ranking is 93/210. The constituency contribution to national poverty was 0.7% (Ndege et. al, 2008).

Many scholars have in the past sought to identify a correlation between poverty levels and academic performance. Most of these studies have come up with expected predictions of low performance among low-class people. Whereas most of the studies have focused on the material aspects of poverty, little has been done to directly cover the role of physiological needs satiation in determining academic outcomes. For instance, the observation that most pupils from economically disadvantaged backgrounds have diminished access to reading materials (Duke, 2000), hence lower academic outcomes fails to acknowledge an equally important observation that in such areas of deprivation, some students have risen to high levels of academic prominence. This implies that beyond material starvation, the satiation of the physiological needs of food, clean drinking water, clean air and adequate sleep played an important intervening role in determining academic outcomes of pupils.

Among factors thought to influence academic performance in pupils, motivation has been cited as the primary driver (Tucker, et al, 2002). While acknowledging that much has been done in theory to elucidate possible mechanisms by which this happens (Anderman & Midgley, 1997), there has been no direct work linking the satiation of physiological needs with the motivation to perform well in class.

1.3Statement of the Problem

Many scholars have associated pupils from low socio-economic status backgrounds with poor performance (Jyoti, Frongillo, & Jones ,2005; Kudzai, 2013). Some studies have linked this to inadequacy in provision of basic needs, a situation closely tied to poverty (eg. Murnane, 2007). The link between poverty and low academic achievement has been well established. For instance, it has been observed that children from low-income families are more at increased risk of leaving school without graduating (Murnane, 2007).Evidence from the National Institute of Child Health and Human Development Early Child Care Research Network has also shown that children in chronically impoverished families have lower cognitive and academic performance and more behavior problems than children who are not exposed to poverty (EFA Global Monitoring Report Team. 2006). This has been attributed not only to the lack of sufficient nutrition but also to factors related to sleep patterns and the feeling of general well-being.

However, in spite of the overwhelming effects of poverty on children's education and development, numerous examples of pupils who have excelled from low-income loci also exist (Luthar, et al. 2000). This set of contradicting evidence begs interrogating whether the satiation of physiological needs plays any role in the academic performance in pupils, and if so, then how exactly does it influence the performance.

1.4 Purpose of the Study

The purpose of the study was to investigate the influence of physiological needs on academic performance in public primary schools of the Eastern Zone of Nakuru Municipality, Nakuru County, Kenya

1.5 Objectives of the Study

The study was guided by the following objectives:

(i) To determine the influence of adequate food provision on academic performance of pupils in the eastern Zone of Nakuru County.
(ii) To determine the influence of adequate supply of clean water on academic performance of pupils in Eastern zone of Nakuru County.
(iii) To determine the influence of adequate sleep on the academic performance of pupils in Eastern zone of Nakuru County

(iv) To determine the influence of family well-being on academic performance of pupils in Eastern zone of Nakuru County

1.6 Research Questions

The study was guided by the following research questions:

(i) How does the provision of adequate food affect the academic performance of pupils in Eastern Zone of Nakuru County?
(ii) How does adequate supply of clean drinking water affect the academic performance of pupils in Eastern Zone of Nakuru County?
(iii) How does adequate sleep affect the academic performance of pupils in Eastern zone of Nakuru County?
(iv) How does family well-being influence academic performance of pupils in Eastern Zone of Nakuru County?

1.7Significance of the study

The study provided information that would be considerably useful in the design of possible intervention programmes by community development agents to influence optimal learning outcomes. The gaps identified in the study with regard to the study objectives could possibly be used to stimulate further studies, which would demystify performance, especially in low-income socio-economic zones. Ultimately the results of the study could potentially provide a theoretical basis for intervention measures in improving achievement of pupils from low-income backgrounds. This, it is hoped, would stimulate new debate towards inclusivity in primary schools, in which schools in struggling backgrounds would receive support to keep the children in school most of the time.

1.8 Scope of the Study

The study was conducted among three hundred pupils selected from ten public schools in the Eastern Zone of Nakuru Municipality, Nakuru County-Kenya. The population sampled on the study comprised of class 8 pupils.The study, based on Abraham Maslow's theory of hierarchy of needs, sought to understand the extent to which the physiological needs satisfaction influenced performance of the pupils. Given that Eastern Zone schools in Nakuru County are located in relatively low-income areas, it was assumed that a significant influence of physiological needs satiation on performance could be signed between the performance of the pupils and the ability to have their physiological needs satisfied.

1.9 Assumptions of the study

The study was carried on with the following assumptions:

(i) Declaration of aspects of family wealth could be used as measure of family well-being.
(ii) The research design would effectively hold constant other potential variables in the study to facilitate the study of the role of physiological needs in performance
(iii) Performance of pupils in end of class 7 examinations would form a suitable base for comparison across schools and the recipients.

1.10 Limitation of the Study

The study had the following limitations:

(i) The study was based on the assumption that schools from low-economic status regions served only pupils who were economically deprived.
(ii) There is no general agreement on metrics aimed to measure what constitutes some of the variables in this study, including food, sleep, clean water and general wellbeing. As a result some degree of observer bias could not be ruled out.
(iii) Due to ethical constraints, controlling for this study was impossible and as a result the researcher had to make sweeping assumptions relating academic performance with various aspects of the study variables.

1.11 Delimitation of the Study

(i) Purposive sampling techniques were employed to ensure that the study sample represented both pupils from low income and those from higher income families.
(ii) The researcher developed metrics for the purpose of comparison across the variables, based on the distillation from various studies, for example, using 8 hours of sleep as a standard for healthy living.
(iii) The researcher dug deeper into observed data in order to make relationships between academic performance and satiation of physiological needs. This was through personal interviews and random performance history checks.

1.12 Definition of Terms

Academic performance

This refers to the behavior of a student that can be directly observed by evaluating what he or she has learnt during a course of study. This behavior can be measured through class work, homework, class participation and tests. As used in this study, it means attainment of above 250 marks in the Kenya Certificate of Primary Education examinations.

Underperformance- As used in this study it means the inability of a pupil to attain the accepted marks of performance, as graded in examinations.

Physiological needs- According to Maslow (1945) they are the most basic needs whose deprivation threatens the survival of an individual also called survival needs. They include food, shelter, water, air and love.

Public primary schools

Government- ran schools from standard one to eight.

Absolute poverty: A condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information.

Relative poverty: Refers to poverty of an individual or group in comparison to the overall standard of living that prevails in a particular society

All nighter's: An act of staying up all night as to study or finish a task.

II. Literature Review

2.1 Introduction

This chapter introduces relevant literature related to the objectives of the study. The first section addresses issues related to poverty and policy mechanisms to address the same, since there is a direct relationship between satiation of physiological needs and poverty. It then discusses factors that have been found to affect academic performance of pupils before analyzing results of studies on the effect of specific physiological needs on academic performance.

2.2Poverty and Provision of Physiological Needs

Though education has been cited as a very important human activity helping any society to fashion and model individuals to function well in their environment, and bridge the inequality gap (Boit,2012, Achoka, 2007), not all have been able to access it to sufficient levels of proficiency due to issues related to poverty.As such though such moves as inclusivity in education to effectively engage all learners regardless of disadvantage (Fraenkel, 2004;Crippen, 2005), issues of poverty as elated to education performance have continued to pervade scholarly discourse.

The Government of Kenya, on its part, has played a pivotal role in spearheading the protection and provision of equal opportunities in education across the. In formulation of the Vision 2030, under the Social Pillar, for example, Kenya is visualized to reduce illiteracy by increasing access to education, and raising the quality and relevance of education. Other goals include integration of all special needs education into learning and training institutions, achieving 80% adult literacy rate, increasing the net enrolment rate to 95% (Vision 2030).

The Ministry of Education Strategic Plan 2006-2011 visualizes a globally competitive educational system, which is responsive to the needs of Kenya and the labour requirements of the economy, with the underpinning values of inclusion, participation and relevance. The concreteness with which pertinent issues of provision of most basic needs to learners in disadvantaged socio-economic contexts have been addressed in this document, however, is questionable. However, the spirit of the document, if well implemented, could see a radical change in the way education is carried out in the country as a precursor to socio-economic development in the country.

The Social Pillar of the Kenya Vision 2030 encompasses sectors such health and education (Government of Kenya, 2007). Under education and training, Kenya envisions providing globally competitive quality education, training and research to her citizens for development and enhanced individual well-being. The overall goal for 2012 is to reduce illiteracy by increasing access to education, improving the transition rate from primary to secondary schools, and raising the quality and relevance of education. Other goals include the integration of all special needs education into learning and training institutions, achieving an 80% adult literacy rate, increasing the school enrolment rate to 95% and increasing the transition rates to technical institutions and universities from 3% to 8% by 2012 (G.o.K, 2007)

The Millennium Development Goal (MDG) 1 envisions eradication of extreme poverty and hunger by 2015. It targets to reduce by half between 1990 and 2015, the proportion of people whose income is less than $1 a day. Though globally there has been decline in the percentage of persons living in extreme poverty, based on projections from the World Bank, the overall poverty rate is still expected to fall below 15 per cent by 2015. By 2015, the number of people in developing countries living on less than $1.25 a day is projected to fall below 900

million. The fastest growth and sharpest reductions in poverty continue to be found in Eastern Asia, particularly in China, where the poverty rate is expected to fall to under 5 per cent by 2015. Projections for sub-Saharan Africa are slightly more upbeat than previously estimated. Based on recent economic growth performance and forecasted trends, the extreme poverty rate in the region is expected to fall below 36 per cent (UN, 2011). A slowdown in progress against poverty is reflected in the number of working poor. According to the International Labour Organization, one in five workers and their families worldwide were living in extreme poverty (on less than $1.25 per person per day) in 2009. This represents a sharp decline in poverty from a decade earlier, but also a flattening of the slope of the working poverty incidence curve beginning in 2007 (UN, 2011).

The implication of this is that if the poverty levels of whole populations are reduced, the populace will be empowered to meet the basic needs of its family members, including those in the primary level of education. The fulfillment of these needs could possibly translate in positive deviation in academic performance among pupils due to channeling of efforts on real learning.

2.3 Factors Affecting Academic Performance

Different studies across the globe have identified different factors that have, in isolation or combined with others, contributed to affect the performance of pupils in school. In a study of the relationship between secondary school pupils' performance need to achieve and their performance in school subjects, Maundu (1980) found a positive correlation between the two variables. An investigation of the relationship between test anxiety and academic performance in secondary schools in Nyeri, done by Ndirangu (2007) found that test anxiety had a profound effect on the performance of students in examinations. What is not clear, though is whether the degree to which physiological needs were met has an effect on test anxiety.

In another study carried out among 235 standard eight Kenyan pupils from six urban and rural primary schools randomly selected from Machakos district, the home environment from which a pupil came was found to have an influence on the motivation of pupils to perform well at school (Muola, 2010). A significant ($p < 0.05$) positive relationship was found between six of the home environmental factors, that is fathers' occupation ($r = 0.22$), mothers' occupation ($r = 0.26$), fathers' education ($r = 0.15$), mothers' education ($r = 0.14$), family size($r = 0.26$) and learning facilities at home($r = 0.23$) and academic achievement motivation. Parental encouragement was the only factor that was not significantly ($r = 0.03$) related to academic achievement motivation. Although these correlations are low, they showed that pupils' motivation to do well in academic work is to some extent dependent on the nature of their home environment. It was recommended that parents needed to be aware of the importance of their role in their children's academic achievement motivation so that they could provide the necessary facilities at home (Muola, 2010).

The impact of family background and school factors on educational achievement is another area that has attracted much debate. The Coleman Report (Coleman, 1966) is one of the most famous studies in developed countries regarding these categories. Their findings indicate that school factors had little effect on academic achievement after taking into account family background factors. Though this was generally accepted for a while, Heyneman's (1976) research in developing countries found that family background is less important than school factors in determining academic achievement in Uganda. Besides, in his next work, Heyneman and Loxley (1983) compared the impact of school and family factors on student achievement in developing and developed countries. They concluded that "the poorer the country, the greater the impact of school and teacher quality on achievement". This conclusion is usually referred to as the "Heyneman-Loxley effect" in educational studies and the finding has been used to justify the importance of school inputs for educational development in developing countries.

2.4 Poverty and Physiological Needs Fulfillment

The fulfillment of physiological needs among pupils is perceived as a direct consequence of socio-economic status of families from which pupils come. Ferguson (2007) hold that educational outcomes are one of the key areas influenced by family incomes. In their view, children from low-income families often start school already behind their peers who come from more affluent families, as shown in measures of school readiness. The incidence, depth, duration and timing of poverty all influence a child's educational attainment, along with community characteristics and social networks.

Controversy has always surrounded attempts to define poverty. One school of thought views it as an economic phenomenon, typically based on income measures with the absolute poverty line typically based on income measures, calculated as the food expenditure necessary to meet dietary recommendations, supplemented by a small allowance for non-food goods. Another school of thought views it from a broader perspective to include not only lacking of material needs but also social deprivation (Engle and Black, 2007). Poverty has been linked to interference with child development, especially if experienced at the formative stages, and this has a negative effect on educational outcomes of developing children.

Child development, in this case, refers to the ordered emergence of interdependent skills of sensory motor, cognitive– language, and social–emotional functioning, which depend on the child's physical well-being, the family context, and the larger social network(Engle, 2007) Though educational outcomes have been variously described to include school readiness, retention, drop-out, educational achievement, and years of schooling completed, in this study it was taken to be performance in examinations. In all countries, poverty presents a chronic stress for children and families that may interfere with successful adjustment to developmental tasks, including school achievement (McLoyd and Wilson, 1990).

Children raised in low-income families are at risk of academic and social problems as well as poor health and well-being, which can in turn undermine educational achievement. The association between poverty and children's development and academic performance has been well documented, beginning as early as the second year of life (Black and Hess, 2000) and extending through elementary and high school. When these risks occur during preschool years, they can have long-lasting consequences. For example, readiness for school on entry to kindergarten sets the trajectory for future success. School readiness is critical to later academic achievement because differences on school entry have long-term consequences.

Lee and Burkman (2002) found that most American students who start school significantly behind their peers can never close the readiness gap. Rather, the gap tends to widen as they move through school. "School readiness has been shown to be predictive of virtually every educational benchmark (e.g., achievement test scores, grade retention, special education placement, dropout, etc)" (p. 21).The consequences of early school failure are increased likelihood of truancy, drop out, and unhealthy or delinquent behaviors.

The link between poverty and low academic achievement has been well established. Low-income children are at increased risk of leaving school without graduating, resulting in inflation-adjusted earnings in the United States that declined 16% from 1979 to 2005, averaging slightly over $10/hour(Murnane, 2007).Evidence from the National Institute of Child Health and Human Development Early Child Care Research Network has shown that children in chronically impoverished families have lower cognitive and academic performance and more behavior problems than children who are not exposed to poverty.

The case cited in the United States of America is not unique to the region, with studies conducted in developing countries showing similar trends. The Education For All Global Monitoring Report of 2006 found that in developing countries children in poverty were at much greater risk of never attending school than wealthier children, and these differences were wide. For instance, in a sample of 80 countries, 12% of children in the top quintile of households never attended school, whereas 38% of children in the poorest quintile never attended school. This is also corroborated by Bruneforth (2006) in his attempted characterization of students who dropped out of school. The noted differences were more highly related to wealth and mothers' education than to urban/rural residence and gender (EFA Global Monitoring Report Team. 2006).

Children raised in poverty also tend to achieve less in school. Analyses show strong positive relationships between socioeconomic status and student achievement across countries, across age levels, and across academic areas of study (EFA Global Monitoring Report Team. 2006). Further, socioeconomic differences in achievement scores, often called socioeconomic gradients exist within most countries, reflecting socioeconomic status–related inequality in educational outcomes (Ross, et al., 2005).

However, in spite of the overwhelming effects of poverty on children's education and development, numerous examples of pupils who have excelled from low-income exist (Luthar, et al. 2000). Twin studies have shown the individual variability in adaptation that exists even when two children with the same genetic make-up are raised in the same context (Carboneau, et al, 2002). Adoption studies also provide a naturalist experiment of how changes in children's primary context, their family, can alleviate the negative consequences of poverty. For example, studies of Romanian children raised in institutional care for the first 2 years of life and then adopted into middle-income British families have shown that many of the children achieved academic and social scores consistent with U.K. norms (Rutter, 1998). The resilience whereby some children are spared from the negative effects of poverty may reflect individual differences in how families cope with poverty or are able to buffer their children as well as individual differences in the children themselves.

2.5 Nutrition and Academic Performance

As used in this study, nutrition refers to the uptake of nutrients by a pupil for normal and optimal functioning of the body. Studies demonstrate that when children's basic nutritional and fitness needs are met, they tend to attain higher achievement levels. Poor nutrition and lack of physical activity have not only been cited as root causes of overweight and obesity, they are also factors associated with lower academic achievement. Consequently, according to Bogden (2000) schools have a critical role in helping students learn and practice healthy eating habits, and in providing the knowledge, motivation, and skills children need for lifelong physical activity.

Studies done with school-aged children have pointed to a direct correlation between poor nutrition and lowered school performance. For example, Kleinman et al. (2002) cited details from a study done with men

aged 27 to 47 that looked at iron and its effect on concentration. Low scores on a concentration test corresponded with lowered levels of iron in the bodies of the subjects. A connection was made between low iron levels in children with attention span; children with iron deficiency anaemia have been shown to have short attention spans. Kretsch et al. also found that zinc was another nutrient that had a role with cognition, specifically with

A New York study found that many students experienced malnutrition that was too slight for clinical signs yet still affected their intelligence and academic performance. This impairment can be corrected through improved nutrition (Schoenthaler, 1991). ASFA (1989) found that among fourth grade students, those having the lowest amount of protein in their diet had the lowest achievement scores. On his part, Parker (1989) found that iron deficiency anemia leads to shortened attention span, irritability, fatigue, and difficulty with concentration. Consequently, anemic children tend to do poorly on vocabulary, reading, and other tests. Children who suffer from poor nutrition during the brain's most formative years have been found to score much lower on tests of vocabulary, reading comprehension, arithmetic, and general knowledge (Brown et al, 1996).

It has also been observed that six- to eleven-year-old children from food-insufficient families had significantly lower arithmetic scores and were more likely to have repeated a grade. Families were classified as food-deficient if they self-reported as sometimes or often not having enough food to eat (Alaimo, et al, 2001)Even moderate under-nutrition (inadequate or sub-optimal nutrient intake) can have lasting effects and compromise cognitive development and school performance (CHPNP, 1995).Morning fasting has a negative effect on cognitive performance, even among healthy, well-nourished children. A test of the speed and accuracy of response on problem-solving tasks given to children who did or did not eat breakfast found that skipping breakfast had an adverse influence on their performance on the tests (Pollitt et al, 1991). From the foregoing it could be concluded that not having a proper and well balanced nutritional regime could impact negatively on a pupil's academic performance.

Proper nutrition has been well documented to enhance academic performance. School breakfast programs, where practiced in the USA, have shown the effective role of nutrition in enhancing academic performance. Studies demonstrate participation in School Breakfast Programs help improve school performance and reduces absenteeism and tardiness Relieves hunger and improves children's ability to succeed at school It increases composite math and reading scores, improves student behavior, reduces morning trips to the nurse, and increases student attendance and test scores (Kleinman, et al, 1998). It improves academic, behavioral, and emotional functioning and leads to increased math grades, lowered absenteeism, and improved behavior (Barnard, 2000). It was also found to simultaneously strengthen children's psychosocial outcomes, lowering anxiety, hyperactivity, depression, and psychosocial dysfunction. Raises scores on basic skills tests and reduces tardiness and absenteeism among participants

Erickson (2006) has pointed out five key nutritional components required to keep the brain functioning correctly. These include proteins, carbohydrates, fats, vitamins and mineral salts. Proteins are used to make most of the body's tissues, including neurotransmitters, (chemical messengers that carry information from brain cells to other brain cells). A lack of protein, also known as Protein Energy Malnutrition, led to poor school performance by children and caused young children to be lethargic, withdrawn, and passive, all of which help affect social and emotional development.

He notes that carbohydrates are broken down into glucose (sugar) which is the main source of energy for the brain, and adds that fluctuating levels of carbohydrates may cause dizziness and mental confusion, both of which can affect cognitive performance. Eating a carbohydrate-heavy meal was noted to cause one to feel calmer and relaxed because of a brain chemical called serotonin and its effect on mood.

Erickson also noted that fat makes up more than 60% of the brain and acts as a messenger in partial control of aspects such as mood. Omega-3 fatty acids are very important to the optimum performance of the brain and a lack of these fats can lead to depression, poor memory, low IQ, learning disabilities and dyslexia.

Erickson (2006) discussed vitamins and minerals as an important substance for the functioning of the brain. Most important are the vitamins A, C, E, and B complex vitamins. Manganese and magnesium are two minerals essential for brain functioning; sodium, potassium and calcium play a role in message transmission and the thinking process.

It has been shown that whereas increased physical activity influence positive performance in class, pupils who are undernourished would tend to be relatively inactive physically. Recent studies show that academic achievement improves even when the physical education reduces the time for academics. A reduction of 240 minutes per week in class time for academics to enable increased physical activity led to consistently higher mathematics scores (NASPE, 2001). Symons (1997) also found that intense physical activity programs have positive effects on academic achievement including increased concentration; improved mathematics, reading, and writing test-scores; and reduced disruptive behavior (Symons,1997). He also found that aerobic conditioning may help to improve memory. Exercise may strengthen particular areas of the brain, and oxygen intake during exercise may enhance greater connections between neurons.

2.6 Water and Academic Performance

While acknowledging that there exists a relationship between water, poverty, health and sanitation Wadan (2012) notes that little knowledge exists about correlation between safe drinking water and academic achievements in schools. In his study aiming to understand knowledge about drinking water and academic achievements in schools in Ghana, Sierra Leone and South Africa, he found positive results with ($x2=7.973>5.991$) at 95% level of confidence, as $r=0.997$, and qualitative analysis showing $r=0.588$, suggesting existence of relationship between drinking water and academic achievements. His results showed that drinking water improves academic achievements in schools.

According to UNICEF (2006), water is fundamental to human life, yet this essence of life can greatly injure the body if its source is not free fro, pollution and infection. Often, the most reported pollutant is human feaces that have not been disposed of and have spread because of a lack of basic sanitation and hygiene, a condition prevalent in most informal settlements. The report further notes that young children are more vulnerable than any other age group to the ill effects of unsafe water, insufficient quantities of water, poor sanitation and lack of hygiene.

Consequently, this would mean that primary school pupils stand to be drastically affected if they do not have access to clean water, both for drinking and for sanitation purposes. Globally, more than 125 million children under five years of age live in households without access to an improved drinking-water source, and more than 280 million children under five live in households without access to improved sanitation facilities. Consequently it has been estimated that about 10.5 million children under the age of five die every year, with most of these deaths occurring in developing countries. Lack of safe water, sanitation and adequate hygiene contribute to the leading killers of children under five, including diarrheal diseases, pneumonia, neonatal disorders and Under-nutrition.

Though the world is on track to meet the target on reducing the proportion of people without sustainable access to safe drinking water (UNICEF, 2006), it is still struggling to keep pace with population growth and ever-accelerating urbanization. Accordingly, target on sanitation will plainly not be met unless progress is greatly accelerated, and if it is not, 2.4 billion people will be without access to basic sanitation in 2015. On both targets, sub-Saharan Africa is lagging far behind the progress needed; in relation to sanitation, South Asia still has a very long road to travel, despite more than doubling its provision between 1990and 2004. The world's children have a right to safe water and basic sanitation, and to the health that these sustain. To a large extent, sustained progress in health, nutrition and education depends upon improvements in water and sanitation. The beneficial effect of fully immunizing a child is entirely lost, for example, if that child dies of diarrheal disease.

2.7 Sleep and Academic Performance

Peters, Joireman, and Ridgeway (2005) have described "sleep patterns" in terms of four different factors: "self-rated satisfaction with sleep", "sleeping during the day", "difficulty sleeping at night", and "oversleeping". Lowry (2010) note that there have been many studies that link unhealthy sleep habits with decreased cognitive functioning. In their study, carried out among college students of the University of Minnesota to determine levels of sleep quality and sleep quantity and its impact on academic performance, surveys were administered to the college students , sleep quality was assessed by the Groningen Sleep Quality Questionnaire, while aspects of sleep quantity included number of nights spent with less than five hours of sleep during the previous week as well as during an average week, number of hours of sleep obtained in an average night, as well as the number *of all-nighter's* the students had pulled in the past year. Results indicated a significant positive correlation between amount of sleep per night with GPA, and a significant negative correlation between average number of days per week that students obtained less than five hours of sleep and GPA.

Edwards (2008) examined the effects of poor sleep habits on the academic performance of children. She assessed the role of poverty rate, medical diagnoses, napping and medication on sleep habits. One hundred ninety-one parents of Kindergarten-4th grade students were asked to complete the Children's Sleep Habits Questionnaire (CSHQ), as well as an informal survey. According to the results, children who were referred to the Student Support Team (SST) had significantly higher scores on the CSHQ subscale Night Wakings. Children who had a diagnosed medical condition had significantly higher scores on the CSHQ Total Score, as well as the subscales Sleep Onset, Delay, Sleep Anxiety, Night Wakings, Parasomnias and Sleep Disordered Breathing. Children taking medication were found to have significantly higher scores on the CSHQ Total Score, as well as the subscales Sleep Onset Delay, Night Wakings, Parasomnias and Sleep Disordered Breathing.

Most importantly, though, children from an elementary school with a 97.7% poverty rate had significantly higher scores on the CSHQ subscales Sleep Onset Delay and Night Wakings. The results of her studies highlight the importance that sleep plays in the development of pupils, effects which could potentially spill over to how pupils performed in class (Edwards, 2008). Consequently, if an individual is not getting the

right quantity or quality of sleep, their daytime functioning will suffer. Alertness and vigilance become irregular, cognitive and motor reactions become delayed, and there is a greater chance of falling asleep in quiet settings. Children may fall asleep in class, and their task performance may suffer (Edwards, 2008).

A study was done by Meijer et al. (2000) that focused on seventh and eighth graders' perceptions of their school functioning and their sleep/wake schedules. Those who had problems getting up in the morning reported being less motivated to perform their best in school. Children who felt more rested had greater motivation to do their best, had a more positive self-image as a student, and were more open to teacher influence (Meijer et al., 2000).

Grades also tend to be affected by length of sleep, as well as the regularity of sleep/wake schedules. A study by Wolfson and Carskadon (1998) indicated that adolescents with self-reported higher grades also reported being on regular sleep/wake schedules, as well as having more total sleep. Students who had As and Bs went to bed earlier and awakened earlier than those with grades of C or below. Similar results were also found during the 2006 Sleep in America Poll carried out by Sleep Foundation. Eighty percent of adolescents who get an optimal amount of sleep report that they achieve A's and B's in school, while those who get insufficient amounts of sleep reported that they were more likely to get lower grades(www.sleepfoundation.org).According to the 2006 Sleep in America Poll, at least once a week, 22% of high school students fall asleep doing homework, 14% arrive late or miss school because they oversleep, and more than ¼ fall asleep in school. In addition, mood can be affected by sleep problems. Seventy three percent of adolescents who reported being unhappy or tense most often feel that they don't get enough sleep. Fifty-nine percent reports feeling too sleepy during the day (www.sleepfoundation.org).

2.8 Motivation and Performance

Of all the factors that have been cited to affect academic performance of pupils, motivation has been found to be most influential. Tucker et.al (2002, p. 477) define motivation as academic engagement or the "cognitive, emotional, and behavioral indicators of student investment in and attachment to education". The same researchers have suggested that only motivation directly affects academic achievement; all other factors affect achievement through their effect on motivation (Tucker, 2002). In consideration of the role that physiological needs would play in the academic performance of pupils, it could be argued that the pathways through which they affected performance were different, and could be through mental development, as well as motivation.

Muchiri and Robertson (2005) observe that rather than partnering with pupils, most education experience in Africa still resorts to external means of control to increase performance. For instance, learning objectives are often pre-set and activities are put in place without input from teachers, pupils or parents. If learners do not see the relationship between themselves and the purpose for the lesson, then they are less likely to become intrinsically motivated to learn. Mutua and Dimitrov (2001) write that learners are most motivated when they believe the tasks they are involved in are relevant to their personal goals. Learning occurs in the context of experiences and relationships, which requires an emotional commitment by the learner. Various theories have been advanced to account for the way motivation affects performance, as discussed in the theoretical framework of the study.

2.9 Performance in Academics

From the perspective of academics, two of the most accurate predictors of a young person's ability to succeed in school are reading readiness (phonemic awareness, vocabulary, alphabet naming, and listening comprehension) and two dimensions of a youngster's social behavior (interpersonal skills: the quality of social relationships with peers, and work-related social skills: a child's degree of independence, responsibility, and self-control) at 54 months of age (5 ½ years of age) (NICHD, 2004). The most current information on improving academic performance notes that there are three environmental influences linked to levels of academic performance among young children (NICHD, 2004). These influences include the following:

1) High quality parenting (the degree to which a youngster is provided with an enriched warm and responsive learning environment—which includes appropriate control and discipline over children—are closely associated with both higher first grade reading and mathematics skills).

2) High quality child-care environments (stimulating activity and nurturing as reflected in high quality parenting).

3) High quality first-grade classrooms (with a focus on literacy instruction, evaluative feedback, instructional conversation, and encouraging child responsibilities).

The significance of this in the study is that it points to a high possibility of a pupil's environment at home and at school influencing how they perform in their academics.

Though this study attempted to examine the influence of provision of physiological needs on performance, from the onset it was appreciated that other factors could also be contributory to the observed

performance of pupils. One such factor was teacher shortage. There have been conflicting estimates of the extent of the teacher shortage with the government claiming that the number of teachers needed is 45, 000 while the Kenya National Union of Teachers puts the estimate at 60,000 (Kimani, 2008). UNICEF estimates a required 31,000 teachers (UNICEF, 2005). Despite the obvious evidence of inadequate personnel audit mechanisms, the undisputed point is that there is a huge teacher shortage for primary schools. The teacher shortage is even more severe in remote rural schools. The 2006 Economic Survey reported that the teacher-student ratio in Kenya rose from 1:40 in 2003 to 1:44 by 2005 (GoK, 2006). The situation is grimmer for schools in the arid and semi-arid areas, as well as those in the slums of urban areas, where the ratio could be as high as 1:100 (UNICEF, 2005). Teaching and learning resources are also in short supply in most schools. The UNICEF (2005) report, while decrying the dismally low rates of participation in northern Kenya, also painted a grim picture of the lack of educational resources. It must be appreciated that an improved teacher pupil: teacher ratio would be a major factor in influencing teachers to motivate performance in pupils.

2.10 Underperformance in Academics

Many theories of underachievement are based on the assumption that students who are not motivated will not perform well. Adolescents' self-expectancy for success and the subjective value they place on an academic task have also been proposed as two factors that most directly predict academic performance and choice (Wigfield & Tonks, 2002). In this expectancy-value model, self-expectancy is defined as adolescents' beliefs about how successfully they will perform an upcoming task. Subjective task value or achievement value is defined as how a task meets the different needs of individuals. Such value is determined by factors such as the importance of doing well on the task, the intrinsic enjoyment value of the task, the usefulness of the task, and the cost of performing the task.

Solorzano (1998) analyzes four theoretical frameworks, under which he argues all theories of underachievement fall; Genetic Determinism, Cultural Determinism, School/Institutional Determinism, and Social Determinism.Genetic Determinists believe that the underachievement of minority children in schools is due to their genetic deficiency. Frameworks of this nature are generally out of favor in educational research. However, Solorzano argues that they may have a resurgence considering newfound interest in the work of Lloyd Dunn, who researches the relationship between race and intelligence quotient (I.Q). Although these theories are generally discredited and have been for a number of years, it is important to recognize the effect that these theories have had on education historically. During the birth of public education and well into the early 1900's, the belief that whites were the smartest race influenced nearly every aspect of schooling, from segregated schools to the ways in which minorities were taught in these schools (Selden, 1999). The popularity of the Eugenics movement gives credence to the impact that racial inferiority theories had on education. The concept of eugenics was created by a group of white scientists who were attempting to scientifically prove that minorities are intellectually inferior via the use of I.Q. and other standardized assessments (Selden, 1999).

While Cultural Determinism focuses on students' cultures and not genetic make-up, these theories often employ race as a way of distinguishing culture. Culture-specific characteristics, including parenting styles, work ethic, and conformity to mainstream culture, are viewed as the reasons why students underachieve. Many culture-specific models employ class as another way of distinguishing student culture. When race is not examined as the reason for underachievement, poverty is. Since the late sixties, there has been an investment of research into the living conditions of students who live in poverty and the effects that poverty has on one's future outlook and educational possibilities (Lewis, 1966).

However, there has been increasing criticism of these culture-centered theories because they more often than not view culture as a deficit to the education of a child, rather than a potential resource. Consequently, perhaps the most significant fact about poverty research is that it is being carried out entirely by middle-class researchers who differ- in class, culture, and political power- from the people they are studying (Solorzano, 1998). While it is hard to deny that the cultural environment of a child plays a role in their educational success or failure, the extent and nature of the effect of culture on schooling is easily debatable and hard to ascertain.

Current examples of culture-centered theories include the work of John Ogbu. While Ogbu takes a specific look at race and culture; he does so in a bi-directional way. Whereas most culture-centered theories place the entire responsibility of performance on the student, Ogbu's theory examines the experiential dynamic between student and teacher. He argues that minorities often form oppositional and reactionary stances within the classroom because of the racialized treatment they receive (Ogbu, 1991). His emphasis on the interplay between students and teachers is based on a strong foundation of evidence which supports the notion that many teachers (whether it be through conscious decision-making or unconscious tendencies) treat students from different backgrounds unequally. Theories such as this one offer a fresher and more realistic perspective of educational realities because they are based on student experiences in school.

Institutional Determinism examines the role that schools play in the education of different student groups. Such theories explore differences found within and across schools.

Bowles and Gintis (1976) offer a widely accepted framework for understanding the role that society and schools play in the education of different groups. They argue that schools do not serve to promote or demote the education of particular student groups but rather perpetuate the existing social inequalities and continue to provide a supply of non-skilled workers for the demand of menial labor in the marketplace. While social reproduction theories hold school structures responsible for the perpetuation of educational and economic inequalities, cultural-reproduction theories examine the use of dominant cultural values as a differentiating tool used by schools and teachers to screen students into tracks of success or failure. Based on the works of Pierre Bourdieu and Jean-Claude Passeron, in the words of Daniel Solorzano, "cultural reproduction theories argue that the dominant class defines what is valued culturally and linguistically, and disguises this 'cultural arbitrariness' in the name of neutrality. Schools devalue and/or ignore the cultural and linguistic traits of subordinate groups, thus reproducing dominant ideologies which function to keep our society exactly where it stands" (Solorzano, 1998).

2.11 Role of School Environments, Teachers and the Community

Odhiambo (2005) contends that there is a growing demand from the Kenyan government and the public for teacher accountability. Schools are commonly evaluated using pupils' achievement data (Heck, 2009) and , as such, teachers cannot be dissociated from the schools they teach and academic results of schools. It would therefore be logical to use standardized students' assessments results as the basis for judging the performance of teachers. Teachers celebrate and are rewarded when their schools and teaching subjects are highly ranked. In Chile, for instance, teachers are rewarded collectively when they work in schools which are identified as high-performing by the National Performance Evaluation System of Subsidized Schools.In Kenya teachers who excel in their teaching subjects are rewarded during open education day held annually in every district. While appreciating the value of rewarding teachers who produce better results, teachers should also not escape a portion of blame when students perform poorly. It has been proved that teachers have an important influence on students' academic achievement. They play a crucial role in educational attainment because the teacher is ultimately responsible for translating policy into action and principles based on practice during interaction with the students. In their study, Wright, et al. (1997) concluded that the most important factor influencing student learning is the teacher. Teachers stand in the interface of the transmission of knowledge, values and skills in the learning process. If the teacher is ineffective, students under the teacher's tutelage will achieve inadequate progress academically. This is regardless of how similar or different the students are in terms of individual potential in academic achievement.

According to Rivkin, *et al.* (2005), there has never been consensus on the specific teacher factors that influence students' academic achievement. Researchers have examined the influence of teacher characteristics such as gender, educational qualifications and teaching experience on students' academic achievement with varied findings. Akiri and Ugborugbo (2008) found that there was a significant relationship between teachers' gender and students' academic achievement. This is contrary to Dee cited in Akiri and Ugborugbo (2008). Yala and Wanjohi (2011) and Adeyemi (2010) found that teachers' experience and educational qualifications were the prime predictors of students' academic achievement. However, Rivkin et al (2005) found that teachers' teaching experience and educational qualifications were not significantly related to students' achievement. Etsy (2005) study in Ghana found that the teacher factors that significantly contributed to low academic achievement were incidences of lateness to school, incidences of absenteeism, and inability to complete the syllabi.

Muchiri and Robertson (2005) explained that educators' attitude towards children (including those from low income backgrounds) is one of the most important factors for success or failure of implementing an education program that is sensitive to the unique backgrounds of the learners. Maintaining a moral purpose is considered to be a teacher's intrinsic motivation for making a difference in the lives of students (Snell and Janney, 2000). A moral purpose provides explanation regarding what inspires an educator to transform or change any element within the classroom and school.

The negative attitudes toward individuals with special needs, and this could be extrapolated to include children from low income backgrounds, are a major mitigating factor in the provision of appropriate education for children with special learning needs (Muchiri & Robertson, 2000; Mutua & Dimitrov, 200I). According to Abosi (2003), most of the negative feelings about persons with special learning needs develop from a lack of proper understanding of disabilities and how they affect the normal functioning of individuals.

Scruggs and Mastropieri's (1998) observation that in some cultures children learn more by observing a skilled performance, not talking about it, could have a great impact when considering the special case of pupils who come from disadvantaged backgrounds, and who could either learn helplessness or learn how to overcome their feelings of helplessness and forge on towards excellence. Research has shown that, especially in the early years, the pupil's home experiences are central in the development of language and literacy (Gee, 2002). Not all

homes, however, provide literacy-rich environments, but teachers can help through forming family and community partnerships in which they communicate about the goals and activities of their programmes and involve parents in decision about curriculum and providing home activities to be shared with family members (Winn & Blanton, 2005).

The history of American education is marked by a long-standing tension between "progressive" visions of education that call for schools to address students' social and academic needs and "traditional" visions that advocate academic achievement as the school's overriding if not exclusive concern. Traditional educators often ask whether in-school community building, an intrinsically social endeavor, will distract from academic achievement, whatever its other benefits for students. In this vein one oft-expressed concern is that educators will compromise academic standards in order to preserve good personal relationships with poorer-performing students. Shouse (1996), for instance, asserts:

. . . a sound basis exists to suspect that low- socio-economic status students will likely be exposed to socially therapeutic—rather than intellectually demanding—values and activities, and that their school's efforts to build supportive and cohesive communities may actually help to divert attention from academic goals (p. 52).

In contrast, progressive educators have contended that "students will care about schools that care about them" and that students will work harder to achieve academically in a context of safety, connection, and shared purpose (Noddings 1996). According to the Collaborative Centre for Academic, Social, and Emotional Learning (2002), improving the social and emotional climate of schools, and the social and emotional soundness of students, advances the academic mission of the schools in important ways. Satisfying the social and emotional needs of students does more than prepare them to learn. It actually increases their capacity to learn.

Although students' experience of community in school may have a direct effect on their liking for school, educational aspirations, academic motivation and engagement, and tendency to stay in school, community does not seem to have a direct effect on achievement as measured by grades or test scores. Instead, the community's effects on motivation and engagement appear to be what, in turn, lead to higher academic grades and test scores. Even then, community building may be insufficient, especially among low-income students and students of color, unless complemented by "academic press"—a set of strong norms and expectations in the school encouraging academic effort and achievement. Academic press prevails when teachers and administrators, and also parents, expect all students to make significant academic progress. This expectation requires a school's staff to come to know each student; to track each student's learning in an ongoing way; and to adjust expectations accordingly to ensure further growth.

Schools recently have come under pressure to show student achievement gains quickly, often within a year or two. It is no longer sufficient to show achievement gains after a period of several years or after students have graduated to a higher level of schooling. Moreover, schools are now called upon to reduce the disparities in achievement among various racial, ethnic, and income subgroups. In light of these new requirements, the combination of community building and academic press appears highly advisable for maximizing achievements.

Caring and supportive school environments have for long been known to have a tremendous impact on the performance of pupils in class. It has affected pupils' academic attitudes, motivation, engagement and goal-setting, their staying in school and graduating, their grades and test scores. Many studies have been done on the subject of poor school achievement for the obvious reason of its influence on future career prospects of the pupils, hence economic development of a country. However, they have also been done due to the recognition of it being a predictor of problem behaviours in late elementary school (Hawkins, et al.1986) as well as middle and senior high schools (Hirschi 1969; Jessor & Jessor 1977).

A substantial body of research shows that, for good or ill, a school's social environment has broad influence on students' learning and growth, including major aspects of their social, emotional, and ethical development. According to Leffert, et al (1997)the social environment is shaped by many factors including the school's espoused goals and values, the principal's leadership style, the faculty's teaching and discipline methods, the policies regarding grading and tracking and the inclusion or exclusion of students and parents in the planning and decision-making processes

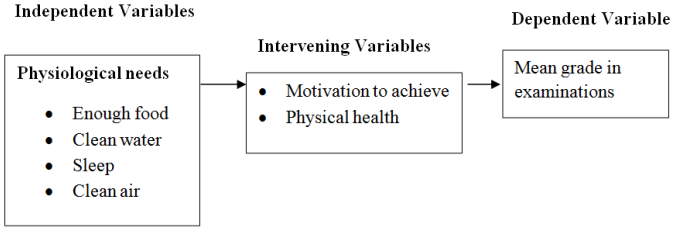
Motivation to achieve, school engagement and bonding to school are listed as among individual assets that affect performance. In addition, environmental issues such as the presence of a caring school climate, parental involvement in schooling, clear rules and consequences in the school and family and high expectations from teachers and parents are cited as playing a critical role in enhancing performance.

When students' basic psychological needs (safety, belonging, autonomy, and competence) are satisfied, they are more likely to become engaged in school (school bonding), act in accord with school goals and values, develop social skills and understanding and contribute to the school and the community. When schools fail, however, to meet students' needs for belonging, competence, and autonomy, students are more likely to become less motivated, more alienated and, overall, poorer academic performers.

2.12 Conceptual Framework

The study conceptualized physiological needs influencing academic performance of pupils through the intervening variables of motivation to achieve and the state of the pupil's health. This illustrated in Figure 1 below.

Figure 1*:* Variables and results –relating motivational factors to pupil's performance.



Sources: Adopted from Maslow's (1945) Hierarchy of needs

According to this framework the physiological needs of a pupil are defined as those needs which, if not met, would threaten the survival of a pupil. Though initially Maslow had considered these needs as purely biological, this study will use a modified definition which will incorporate other basic needs such as shelter and adequate clothing into the original definition. These factors, it was assumed, did not affect the learning outcomes of pupils directly but did so by influencing their levels of motivation for achievement.

The study theorized that a pupil would not be able to take learning seriously if they were hungry most of the times, or were exposed to conditions that threatened their very existence as human beings through deprivation. If pupils were inadequately fed, dressed or housed, there would be a higher probability of them missing out on school and, even if they attend school, there would be a great possibility of them lacking the necessary concentration to give their lessons due diligence.

This study attempted to consider how the basic needs at the bottom of the needs pyramid proposed by Maslow interacted with a pupil's motivation levels and their predisposed abilities to influence their performance in examinations. The examinations that were considered for this study were the Kenya Certificate of Primary Education (KCPE) Examinations. Motivation to achieve was analyzed based on the various theories of motivation discussed in chapter two of this report.

2.13 Theoretical Framework of the Study

The study was organized based on several theories of motivation.

2.13.1 Goal Theory

The Goal Theory proposes that there are two types of motivation for achievement in school: Performance goal orientation and task goal orientation. Students with an ability or performance goal orientation are concerned with proving their competence by getting good grades or performing well compared to other students (Anderman & Midgley, 1997). On the other hand, students with a task goal orientation are motivated by a desire to increase their knowledge on a subject or by enjoyment from learning the material. Studies have shown that students with a task goal orientation are more likely to engage in challenging tasks, seek help as needed, and adopt useful cognitive strategies, and, possibly most importantly, tend to be happier both with school and with themselves as learners (Ames, 1992; Anderman & Midgley, 1997).

Research involving qualitative methods has suggested that, despite a lot of emphasis on the task goal and performance goal orientations, social goal orientations are also associated with academic achievement (Kaplan & Maehr, 2002). Urdan and Maehr (1995) describe four types of social goals: social approval, social compliance, social solidarity, and social concern. Dowson and McInerney (2001) found that students showed characteristics of four different goal orientations: work avoidance, social affiliation, social responsibility, and social concern. Students attempting to avoid work often had the teacher complete their work for them or copied off of another student, or simply engaged in off-task behaviors (Dowson & McInerney, 2001).

While the social affiliation orientation is usually also considered detrimental to students' work habits, students in this study said working with their peers helped engender a sense of belonging but also helped them work more effectively and promoted positive feelings toward learning. Only sometimes would working with other students lead the students off task. Students with a social responsibility goal orientation were motivated by a desire to fulfill their role expectations. These included parent, teacher, and peer expectations (such as participating in extracurricular activities, helping the class as a whole or individual students, and behaving responsibly when holding an important student government position). Students felt proud, excited, and satisfied when they met these expectations.

Students with a social concern orientation worked hard to succeed so that they could then help others. This orientation therefore shows that academic achievement is both a result of and a precursor to pro-social behavior. Overall, Dowson and McInerney (2001) conclude that perhaps researchers were incorrectly focusing

on performance and task goals when students are actually most concerned with meeting their social goals at the middle school level.

2.13.2 Self- Determination Theory

The theory states that students need to feel a sense of competence, a sense of relatedness to others, and a sense of autonomy (Anderman & Midgley, 1997). Competence involves not just having the knowledge to complete various tasks, but also believing that one can do so. Relatedness refers to the connections that are formed with one's peers. Autonomy includes initiating and regulating one's tasks. These student needs are particularly relevant to adolescents in middle school since children at this age are developing a sense of identity and have increased cognitive abilities (Anderman & Midgley, 1997). Ryan (2001) further investigated the importance of relatedness, specifically looking at the impact of one's peer group on motivation.

Relationships with peers become much more important in early adolescence as children start to spend more time with peers and form relationships that are closer and more intense than before. The results showed that the peer groups accounted for change in students' achievement over the school year after controlling for selection. Peer groups also influenced changes in intrinsic value for school, though they did not impact views on the usefulness and importance of school. This theory's relevance is in interrogating whether the (lack of) provision of physiological needs could affect the way pupils related with one another, and whether this had a capacity to intervene in a pupil's academic performance.

2.13.3Attribution Theory

Attribution Theory addresses students' sense of competence, specifically how students are affected by their previous performance. It suggests that students are more influenced by their perceptions of what caused their earlier successes and failures than by the actual experience (Anderman & Midgley, 1997). While it is popularly believed that students who are successful will want to continue being successful, Weiner suggests this does not occur if students do not attribute the success to their own actions and instead attribute it to something else, such as luck (ibid). Furthermore, when students fail, they are more likely to be motivated to try harder the next time only if they think that lack of studying or something elsein their control led to the failure, rather than attributing the failure to things outside their locus of control. The extent to which satiation of physiological needs would affect a pupil's sense of competence at the task of learning is worth investigating, especially given that this satiation operates through other intervening variables, including motivation.

Several studies have investigated student motivation specifically among African American students. Tucker (2002) studied the motivation of 117 African American students mostly from low-income families in first through twelfth grade. They found that teacher involvement was the strongest predictor of student motivation. However, other studies have shown that African American students, as well as other ethnically diverse and low income students, feel that they receive significantly less support from their teachers than European Americans students (Tucker et. al, 2002). Students' perceived relatedness and perceived autonomy also directly influenced academic engagement, while perceived competence and teacher structure affected perceived relatedness and teacher autonomy support affected perceived autonomy.

Hwanget. Al,(2002) interviewed sixty high achieving African American college students about their reasons for choosing their majors and for studying, and about their educational values. They found that, contrary to the predictions of other researchers, the students did not all hold an intrinsic goal orientation (that is, a task goal orientation). Instead, the students integrated a combination of intrinsic, extrinsic (that is, performance), future, and social goals. For instance, many of the students who were extrinsically motivated wanted to perform well so they would have better career opportunities, and were thus incorporating a future goal orientation.

The theories discussed so far do not bear directly on the physiological needs of the pupils and how these influence their academic performance; they will be useful as a basis of comparison and integration with the Maslow's theory, which is discussed below.

2.13.4 Maslow's Theory

According to Maslow (1945) human behaviour is motivated by the degree of attainment of their needs. He identifies and organizes these needs into a hierarchy as described below. The achievement of lower level needs opens up the individual to be influenced by desire for gratification of higher level needs.

Physiological needs are usually taken as the starting point for motivation theory and are also called physiological drives. They are based on the concepts of homeostasis and appetites. Homeostasis refers to the body's automatic efforts to maintain a constant, normal state of the blood stream. This has to do with the water content of the blood, salt content, sugar content, protein content, fat content, calcium content, oxygen content, constant hydrogen-ion level (acid-base balance), and constant temperature of the blood. Appetites, a preferential treatment for some particular foods, have been found to be a fairly efficient indication of actual

needs or lacks in the body. Young in a recent article (21) has summarized the work on appetite in its relation to body needs. If the body lacks some chemical, the individual will tend to develop a specific appetite or partial hunger for that food element. The safety needs set in once physiological needs are relatively well gratified. All that has been said of the physiological needs is equally true, although in lesser degree, of these desires. The organism may equally well be wholly dominated by them. They may serve as the almost exclusive organizers of behavior, recruiting all the capacities of the organism in their service, and we may then fairly describe the whole organism as a safety-seeking mechanism.

If both the physiological and the safety needs are fairly well gratified, then there will emerge the love and affection and belongingness needs, and the whole cycle [p. 381] already described will repeat itself with this new center. Now the person will feel keenly, as never before, the absence of friends, or a sweetheart, or a wife, or children. He will hunger for affectionate relations with people in general, namely, for a place in his group, and he will strive with great intensity to achieve this goal.

Self-esteem needs, which then set up, refer to the need or desire for a stable, firmly based, (usually) high evaluation of oneself, for self-respect, or self-esteem, and for the esteem of others. By firmly based self-esteem is meant that which is soundly based upon real capacity, achievement and respect from others. These needs may be classified into two subsidiary sets. These are, first, the desire for strength, for achievement, for adequacy, for confidence in the face of the world, and for independence and freedom. Secondly, there is the desire for reputation or prestige (defining it as respect or esteem from other people), recognition, attention, importance or appreciation.

The need for self-actualization comes in at the apex of the needs hierarchy. It refers to the need to do what one is fitted for. It refers to the desire for self-fulfillment, namely, to the tendency for him to become actualized in what he is potentially. This tendency might be phrased as the desire to become more and more what one is, to become everything that one is capable of becoming. The specific form that these needs will take will of course vary greatly from person to person.

Though this study will zero in mainly on the attainment of physiological needs and their influence on academic performance, this will be done within the context of a fluid state of flexibility to accommodate the interaction between the various levels in the hierarchy.

2.14 Summary of Reviewed Literature

The literature reviewed in this section has presented both empirical evidence to suggest the role that physiological needs play in academic performance. Content analysis of various studies have justified an enquiry into the exact nature of intervention that the various variables in the current study employ in influencing academic performance. The anchorage of the various studies on leading theories of motivation and performance provides concrete basis for the study to proceed.

III. Research Methodology

3.1 Introduction

This chapter describes the methodology used in this study. It entails the research design, population of the study, sample size, sampling procedure, data collection instrument, instrument validity, instrument reliability, data collection procedure, and description of data analysis

3.2 Research Design

The study used *ex post facto* research design that is generally useful in determining perceptions of respondents on variables that are beyond the researcher's control (Kerlinger, 2002). The study focused on the influence of pupils' physiological needs on performance in public primary school pupils of the Eastern Zone of Nakuru municipality Kenya. The researcher did not have direct control of these independent variables because their manifestation had already occurred but only studied them retrospectively to establish the possible causal relationship with pupils' performance. (Fraenkel and Wallen, 2006).

3.3 Research Methods and Suitability

The study employed a combination of content analysis of secondary data as well as statistical treatment of the primary data collected during the study period. The secondary data relied on for the study was the end of term examination result scores for the respondents for three consecutive terms. An average performance over the three successive examinations was used as a basis for computing a metric for academic performance. The reasoning behind this was the assumption that taking the average of three consecutive examination results would give a more accurate picture of performance than picking on only one examination result.

The primary data for this study was collected by use of a questionnaire. A questionnaire was chosen due to its versatility especially in collecting data related to perceptions of respondents. The instrument was designed with the pupils in mind and care was taken to use simple language for easier understanding.

3.4 Data Collection Instrument

The researcher administered pupil questionnaire to all the respondents in the study as a means for data collection. According to Gray (2004) a questionnaire is a research tool through which respondents are asked to respond to similar questions in a predetermined order. It is relatively economical and has standardized questions, which are responded to under conditions of anonymity (McMillan and Schumacher, 1993). Questionnaires make it possible to measure what a person knows (knowledge or information), what a person likes and dislikes (values and preferences), and what a person thinks (attitudes and beliefs) (Tuckman, 1994).

The mostly used Likert Type Scale is either a four or five point scale (Gray, 2004), though three -point scales are also used (McMillan & Schumacher, 1993). In this study a five point Likert-Type Scale was used to register the extent of agreement or disagreement with a particular statement of attitude, belief or judgment (Tuckman, 1994). The advantage of Likert Type Scales is that they provide "greater flexibility since the descriptors on the scale can vary to fit the nature of the questions or statement" (McMillan & Schumacher 1993).

The questionnaire also had both open ended and close ended questions. The questionnaire had two parts: part A aimed to collect the respondent's biodata, while part B collected information on the respondent's socio-economic background and academic performance. Items 1 –12 on the questionnaire collected information on age, grade, academic performance and social economic status (parental education, parental employment and family structure). Item 13 aimed to measure perceptions of respondents using the Likert scale, on various issues related to the objectives of the study from the respondents.

3.4.1 Instrument Validity

In order to ascertain content validity, the questionnaire was designed and handed to the supervisors and to experts in the area of school guidance and counseling to review the items, and by also carrying out a pilot study. Low response rate was overcome by appealing to the respondents' goodwill, explaining the significance of the study to them and assuring them that their responses would be held confidentially and by seeking express permission from their parents for their involvement (Nachmias & Nachmias 1996).

3.4.2 Instrument Reliability

To ensure consistency, the present data was subjected to reliability tests using the split- half test. This involved scoring two halves (odd items versus even items) of the instruments for each person and then calculating a correlation coefficient for the two sets of scores. The coefficient indicated the degree to which the two halves of the instrument provided the same results and hence described the internal consistency of the instrument. The correlation reliability coefficient was calculated using the spearman brown prophecy formula (Fraenkel & Wallen 2006).

$$\text{Correlation reliability coefficient} = \frac{2 \times \text{reliability of half test}}{1 + \text{reliability of half test}}$$

The instrument was adopted since the correlation reliability co efficient for each instrument was 0.7, which was acceptable (Mugenda and Mugenda, 1999).

3.5 Data Collection Procedures

Before the actual administration of the questionnaire the researcher visited the sampled schools to verbally explain the purpose of the study. The actual administration of the questionnaire was done at 3:30pm to correspond with the time the pupils had finished the day's classes; to avoid inconveniencing the normal school program. The researcher personally administered the questionnaire to the pupils. This ensured higher return rate of the questionnaire (72%). Simultaneously, document analysis was carried out on schools records to determine academic performance of the pupils that were used for study.

3.6 Data Analysis Methods

Descriptive statistical measures of central tendency like the mean, mode and percentages were used to summarize results and present the data in form of tables and charts. One way ANOVA was used to determine the degree of influence that the independent variables had on the dependent variable. A p value of .05 was set at a confidence level of 95% and for p value less than .05, the influence was taken to be statistically significant. The programmes used were Microsoft Excel and Statistical Package for Social Sciences (SPSS)

3.7 Location of Study

The study was carried out in public primary schools of the Eastern Zone of Nakuru Municipality-Kenya.Nakuru Municipality is situated in Nakuru town, the fourth largest town in Kenya and the administrative headquarters of Nakuru County. The municipality has five zones: Western, Southern, Northern, Central and

Eastern. The Eastern Zone was chosen for this study because the schools therein served a predominantly low income populace, which was the target of this particular study.

3.8 Population of the Study

The target population for the study was 800 class 8 pupils present in the fifteen public primary schools in Eastern Zone of Nakuru Municipality.

3.9 Sample Size

At a confidence level of 95% and margin of error of 5.0% 370 pupils were selected for the study. This represented approximately 30% of the total population. Gay (1992) observes that random sampling ensured adequate representation from all constituencies in the study, and could also form a basis for comparison of observed phenomena across the subsets of the population.

3.10 Sampling Procedure

Using systematic random sampling, the researcher drew10 schools out of the total 15, carefully balancing schools from the poorest neighborhoods with those from slightly higher social strata.From each school 37 pupils were chosen at random and selected to participate in the study using the table in Appendix 3. In systematic random sampling, every K^{th}value qualifies for sampling. On selecting the sampling interval, the total population size was divided by a sampling frame of 800 to get 8 cases that is;

Cases = $\frac{\text{population (sampling interval)}}{\text{Sample size(sampling frame)}} = \frac{800}{370} = 2$

Using a class interval of 2, every second pupil from the chosen schools was used as part of the sample for the study.

3.11 Piloting of the Study

To ensure that the questionnaire items measured what they were intended to measure, a pilot study was conducted in three of the schools within the same zone, but in which samples were not drawn for the final study. Non-contamination was ensured by choosing schools that were distant from those considered in the study to ensure no leakage of information. The results were used to modify the questionnaire on items that were not very clear.

3.12 Ethical Issues

The researcher obtained a letter of introduction from Maasai Mara University to take to the National Council for Science and Technology, which gave the permit for the data collection. This letter was issued to the MEO's office and head teachers in the schools within the target population. The researcher personally visited the schools and introduced the research to the school heads. Written consents were also sought from parents of participating pupils to authorize their children to be involved, as an ethical safeguard

3.13 Operational Definition of Variables

Adequate sleep: The World Health Organization standard of 8hours of sleep daily for healthy living was used as a basis for measuring adequacy of sleep.

Nutrition: For the purpose of this study taking of three meals per day was taken to be a standard measure of adequate nutrition. The aspect of nutrition that was considered was about the stomach being filled up.

Water: Access to continuous supply of tap water was used as a measure of access to clean drinking water.

Wellbeing: The wellbeing of the pupil was measured in terms of perceptions on satisfaction levels with their current families

IV. Results and Discussion

4.1 Introduction

A total of 267 out of the 370 pupils engaged in the study, responded fully to the questionnaire that was administered, representing an approximately72 % return rate. For the purposes of this study this return rate was considered adequate for analysis. The range of ages for the respondents was between 14 and 21, and the mean was taken at 14.7 years. 50.5% of the respondents were male while 49.5% were female.As shown in table 1, the academic performance of the sample was low with the mean performance showing a standard deviation of .718 from the midpoint towards the lowest scores.

Table 1: Sample summary

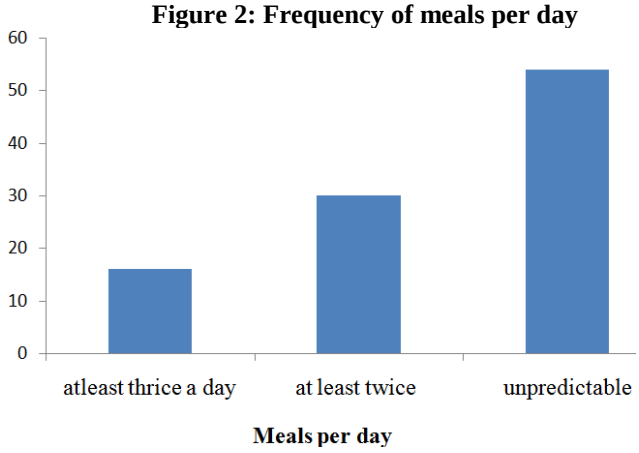
Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Academic performance	266	1	3	2.35	.718
Residence	266	1	3	2.38	.676
Who you live with	266	1	3	2.02	.799
Economic status	266	1	3	2.36	.658

In analyzing the table results 1 represented high, 2 middle, and 3 low. As such a mean academic performance of 2.35 with a standard deviation of .718 was indicative of a deviation towards low performance. The results also show that most of the respondents came from the lower economic classes as depicted by their areas of residence, and the kind of assets owned by parents or guardians (mean 2.38 and 2.36, respectively). The possession of equipment which were capital intensive or with capability to generate revenue was considered a mark of higher economic status. The means for the population indicate skewing towards the lower classes.

4.2 Influence of adequate food provision on academic performance of pupils in the eastern Zone of Nakuru County.

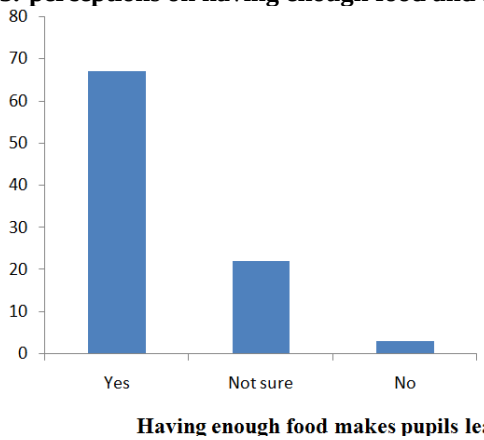
In determining the influence of adequate food provision on academic performance of pupils in the Eastern Zone of Nakuru County, the study assumed that taking of at least three meals in a day was an acceptable standard, and anything below that was considered inadequate. Based on this, and as is illustrated in Figure 2, over 50% of the respondents indicated having meal-inadequacy on a daily basis.

Figure 2: Frequency of meals per day



Only about 10% of the respondents did not believe that having enough food could make pupils learn well. This is illustrated in Figure 3. This means that if the pupils believed that having enough food makes pupils learn well, any inadequacy in the supply of food to them could serve as a demotivator towards academic performance.

Figure 3*:* perceptions on having enough food and academic performance



The results of one way ANOVA for meals per day and academic performance (p=.292, F= 1.244), having enough food makes pupils learn well (p = .694, F = .366) did not sign any positive influence on

academic performance. There was, however, a statistically significant influence of actually having enough food on academic performance (p= .030, F= 3.617), as shown in Table 2

Table 2: One way ANOVA results on effect of nutrition on academic performance

Variables		Sum of squares	df	Mean square	F	P
Meals per day	Between Groups	1.423	2	.712	1.244	.292
	Within Groups	66.943	117	.572		
	Total	68.367	119			
Having enough food makes pupils learn well	Between Groups	.275	2	.137	.366	.694
	Within Groups	43.850	117	.375		
	Total	44.125	119			
I believe I have enough food daily	Between Groups	3.703	2	1.852	3.617	.030
	Within Groups	59.888	117	.512		
	Total	63.592	119			

This would tend to support Ghosh & Saha's (2011) articulation of the importance of nutrition in the health and consequent human resource development which ultimately results in community or national development. Though studies have shown that chronic malnutrition experienced during early life inhibits growth, retards mental development, and reduces motivation and energy level, causing a reduction of educational attainments and delay in school entry (Popkin & Ybanez, 1982), Ghosh & Saha's (2011) study conducted among college students also showed that nutrition played a role in academic achievement in some courses. This would therefore imply that nutrition had the capacity to influence academic outcomes even in primary schools.

4.3: Influence of adequate supply of clean water on academic performance of pupils in Eastern zone of Nakuru County.

In the determination of the influence of adequate supply of clean water on academic performance in Eastern Zone of Nakuru County, access to clean tap water was evaluated. The water situation in the area of study was found to be erratic. Though over 70% of the respondents indicated having access to tapped water, only about 5% reported continuous access to the essential commodity. By inference, this means that at some point, most of the respondents had to rely on water supply whose safety at point of origin and in handling by the water vendors could not be verified. If this were the case, the prevalence of waterborne diseases would be expected to be high among the pupils. The common diagnosed ailments among the pupils were typhoid fever, amoebiosis, and dysentery, which are water-related. This tallied with observations of frequent absenteeism of pupils from school on health issues related to water-borne diseases. This had a great bearing on the academic performance of the pupils. One way ANOVA results on the influence that clean water supply had on academic performance of the pupils signed a positive significance (P=.02, F= .366), implying that availability of clean water influenced academic performance among the pupils in Eastern Zone of Nakuru Municipality. This is shown in Table 3.

Table 3: Results of one way ANOVA on influence of water availability on academic performance

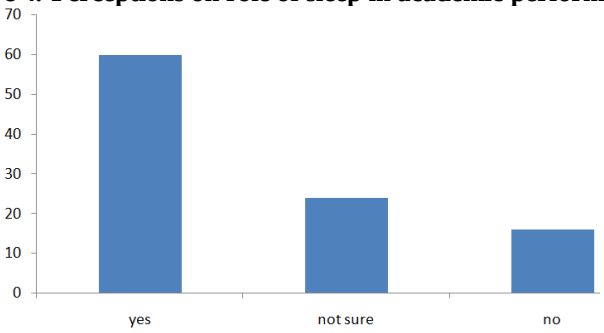
Variables		Sum of squares	df	Mean square		P
Having continuous access to tap water	Between Groups	.275	2	.137	.366	.02
	Within Groups	43.850	117	.375		
	Total	44.125	119			

This is in agreement with UNICEF's (2006)assertion that clean water supply was essential, not only to lower infant mortality, but also increase productivity, hence increase academic performance of pupils at school.

4.4 Influence of adequate sleep on the academic performance of pupils in Eastern zone of Nakuru County

Whereas over 60% of the respondents indicated belief that having enough sleep enhanced academic performance of pupils as shown in Figures4(a) and (b), only about 34% were confident that they had enough sleep everyday.

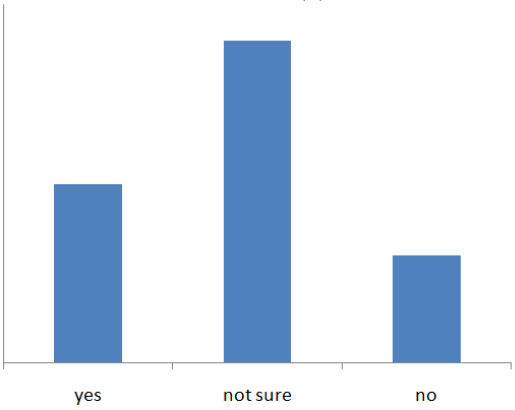
Figure 4*:* Perceptions on role of sleep in academic performance



I believe enough sleep helps pupils learn well

(a)

(b)



I have enough sleep in academic performance

Table 4*:* Results of one way ANOVA on influence of sleep on academic performance of pupils

From the two figures it is clear that there is congruence between the pupils' perceptions on role of sleep in academic performance and their relative satisfaction with current levels of sleep.

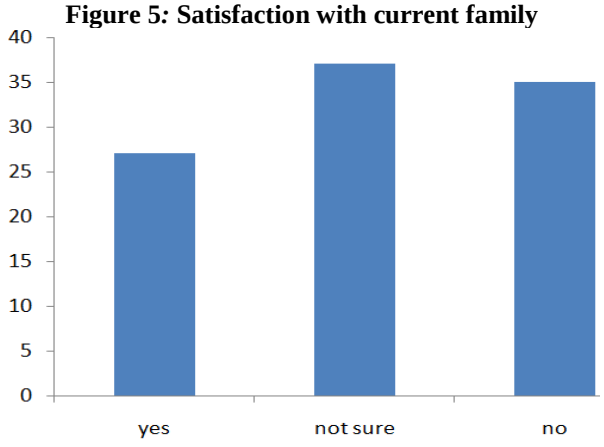
This agrees with Lowry's (2010) observation that linked unhealthy sleep habits with decreased cognitive functioning. In the study that aimed to measure aspects of sleep quantity and quality there was an indication of a significant positive correlation between amount of sleep per night with GPA, and a significant negative correlation between average number of days per week that students obtained less than five hours of sleep and GPA. As such the pupil's perceptions matched results from actual studies.

The result of one way ANOVA on the influence of actual length of sleep and perceptions on length of sleep on academic performance, however, show that the two did not sign any significant influence on the latter. The perceptions on how sleep time affects academic performance (P= .337, F= 1.099), and the actual sleep time of the respondents related to their academic performance (p= .699, F= .360) show no statistical significance since $p > .05$

4.5: Influence of family well-being on academic performance of pupils in Eastern zone of Nakuru County

The fourth research question aimed to determine the influence of family wellbeing on academic performance of pupils in Eastern Zone of Nakuru County. Over 35% of respondents signed not being satisfied with the kind of families they were in and that they would not have minded being born in different families. Another 37% signed not being sure of their satisfaction levels, as illustrated in figure 5.

Figure 5*:* Satisfaction with current family



The results of one way ANOVA on aspects of family well-being on academic performance were as shown in table 2.

Table 5*:* Results of one way ANOVA on aspects of family wellbeing on academic performance

		Sum of Squares	df	Mean Square	F	P
Residence	Between Groups	1.122	2	.561	1.233	.295
	Within Groups	53.244	117	.455		
	Total	54.367	119			
Economic status	Between Groups	.828	2	.414	.954	.388
	Within Groups	50.764	117	.434		
	O Total	51.592	119			
Proud of residence	Between Groups	.779	2	.389	.695	.501
	Within Groups	65.546	117	.560		
	Total	66.325	119			
My family meets all my needs	Between Groups	4.872	2	2.436	4.209	.017
	Within Groups	67.719	117	.579		

As seen from table 2 there was no statistically significant influence of residence (F= 1.233, df=119,P=.295) and economic status (F=.954, df= 119, P= .388) on academic performance. The perception of pupils' needs being met at the personal level, however, signed some influence on academic performance (F= 4.209, df= 119, P= .017).

Tucker *et al.* (2002) had earlier obseved that personal motivation played a great role in influencing pupil performance. Added to Muola's (2010) assertion that the home environment of a pupil had an influence over a pupil's level of motivation to perform, it would appear that the important aspect of the home environment that influenced academic performance in pupils was not merely the physical infrastructure, as the meeting of the basic needs of the pupils.The results appeared to augment NHID's (2004) observation that high quality parenting and child care greatly influenced the academic performance of children. Coleman (1966) had also proposed that school factor only became important in influencing performance of pupils in examinations not in isolation, but in close association with the home conditions under which the pupils lived.

V. Summary, Conclusions and Recommendations

5.1 Introduction

This chapter contains the summary, conclusion and recommendations of the study. It starts by presenting a general summary of the findings of the whole study, and then proceeds to give summaries based on the study objectives.

5.2 Summary

According to the study over 50% of the respondents from Eastern Zone of Nakuru County came from the lower ranks in the socio-economic ladder, as depicted by their areas of residence, and the kind of assets owned by parents or guardians. The general academic performance in the zone was also below the average pass mark of 250 out of 500.

Whereas the study started with the assumption that nutrition played a significant role in influencing the academic performance of pupils, the results were not entirely conclusive. The study did not find number of

meals per day, or the belief that having enough food per day influenced academic performance. However, actually having enough food to eat signed some positive influence on academic performance, implying that nutrition had the capacity to influence academic outcomes even in primary schools. By this were implied aspects of quantity and quality of nutrition received by the respondents.

According to the study the access to safe tap water in the area was found to be erratic, resulting in families frequently buying water from hawkers. This, at times, led to occurrence of water-related diseases like typhoid and amoebic dysentery. From the results of the study there was a statistically significant relationship between the availability of clean water for drinking and sanitation and academic performance.

Congruence was also posted between the pupils' perceptions on role of sleep in academic performance and their relative satisfaction with current levels of sleep. Whereas other studies have linked unhealthy sleep habits with decreased cognitive functioning, this particular study did not find any statistical significance in the relationship between sleep and academic performance of the pupils. As such the number of hours spent by a pupil in sleep was not found to influence their academic performance.

Whereas the study considered various aspects of wellbeing such as satisfaction with the current family one was in, and perceptions on importance of family wellbeing on academic performance, the only factor under family well-being that seemed to influence academic performance of pupils in Eastern Zone of Nakuru County was the feeling that their personal needs were being met. The place of residence of pupils and the economic background of their families did not seem to influence academic their performance.

5.3 Conclusion

Based on the results of the study it could be concluded that the academic performance of pupils from Eastern zone, a low socio-economic locale within Nakuru County, was majorly influenced by satiation of nutritional needs, supply of continuous flow of fresh water and the general feeling that pupils needs were being met by their families of origin. The direction of influence, however, could not be determined as it was beyond the scope of the study. As such Abraham Maslow's hierarchy of needs theory, it can be concluded, does not absolutely explain existence of differential performance among pupils in low socio-economic areas.. Other intervening factors come into play. Ultimately the study concludes that there is need for pupils from struggling socio-economic backgrounds to be identified and put through support programmes that would boost their sense of worth and hence enhance their capacity to perform well in school.

5.4Recommendations

Based on the findings and conclusions, this study made the following recommendations aimed at improving the performance of pupils in public primary schools:

1. Creative effort should be made to boost nutritional uptake of pupils within learning institutions in low-income areas to improve on academic performance.
2. Government agencies and other nonprofit organizations should consider taking up water and sanitation projects to the grassroots to ensure better learning outcomes from pupils.
3. Despite sleep not signing significant influence on academic performance, still, it is recommended that pupil's should have at least 8 hours of sleep daily, as recommended by the World Health Organization (WHO).
4. Teachers, as facilitators of learning and agents of motivation need to invest more time with pupils from low economic backgrounds as they needed greater stimulation to perform at the same level as those from more stable economic backgrounds. Family support was also critical in boosting morale for performance of pupils who experienced a great deal of family support had a greater motivation and performed well despite their socio-economic backgrounds.

5.5Suggestions for Further Study

1. A similar study should be conducted in a different district in the country. This would give further insight as to whether pupils' responses would tally with what was observed in Eastern Zone of Nakuru Municipality.
2. It would be important to conduct a study in pupils of public primary schools to determine their perceptions of how their mental processes are influenced by their physiological state and how that affected their perceptions of the self and ultimately their academic performance.
3. There is need to research more on models that would help improve learning environments to especially improve self-worth of pupils. This is identified as the main catalyst in academic performance, since it is intrinsic in the pupil.
4. Another area worth exploring is the determination of direction of influence among the various physiological needs on their effects on academic performance.

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