READING LITERACY
IN RELATION TO PATTERNS OF ACADEMIC ACHIEVEMENT IN KENYA

by

John Odwar Agak

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ABSTRACT

How is reading literacy related to academic achievement among 14 year old students in Kenya? This was the main issue in focus for the present study.

The IEA Reading Literacy Test was used for measuring reading literacy and the Kenya Certificate of Primary Education (KCPE) was used for measuring academic achievement. It was hypothesized that there are degrees of variation in correlation between reading literacy and each subject areas a student opts for at KCPE. It was also hypothesized that there is a variation in performance on reading literacy due to influences caused by background factors (literacy interaction) and voluntary reading processes.

Reading literacy was assumed to be decomposable into latent variables including: a general reading ability factor, a document reading factor and specific passage factors. However, such a measurement model was not successful. The selected measurement model constituted only two latent variables: a general reading ability factor which covers most of the items with very few exceptions and a documentary factor which entails those items related to identification, location and association of information in brief documents. There was also a clear evidence that the postulated components of academic achievement, namely: general reasoning and verbal abilities were present in this study. General reasoning ability proved to be the main factor across most of the subjects at KCPE while verbal ability was connected to the subjects loaded mainly with connected texts to be comprehended.

When voluntary reading was explored, a good measurement model was obtained. The measurement model for voluntary reading encompassed seven different types of voluntary reading topical readings from books, magazines and newspapers. Significant relationships between voluntary reading and both reading literacy and academic achievement were observed. An examination of the background factors in the study indicated that they have an impact on students' performance on reading literacy and academic achievement. A strong relationship between reading literacy and academic achievement was noted especially when latent variables were used. This relationship remained even when the background factors were controlled. The measurement model for reading literacy and academic achievement turned out to be the same. However, there were some differences in terms of performance on reading literacy and academic achievement location wise.

Key words: academic achievement, reading literacy, Lisrel, performance, Kenya.

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Chapter One

Introduction

Reading literacy and academic achievement are certainly not naturally evolved practices or skills like walking or talking. Instead, they are acquired in a cultural process of human development. The extent to which an individual learns reading skills for him/her to succeed academically depends on the social demands within his/her community (see Lundberg & Høien, 1991; Olson, 1994).

While one may think of literacy as a cultural practice that is deeply embedded in a specific cultural context, the conventions of print, the linguistic forms, styles of narration and exposition show remarkable similarities across different cultural settings. In a sense, there is unity among nations as what may be called global literacy but there is diversity as well due to tendencies of variability among countries and cultures based on their individual goals and objectives.

In the next section, an attempt is made to define literacy.

Towards a definition of literacy

Literacy is a word that is commonly used in both local and international circles with ease sometimes without considering its implications. While for one to be literate would mean: " to be able to read and write", research indicates that it has a deeper meaning (Langer, 1987; Lundberg & Høien, 1991; and Lind & Johnson, 1990) as follows:

"A person is literate when he has acquired the essential knowledge and skills which enable him to engage in all those activities in which literacy is required for effective functioning in his group and community and whose attainment in reading and writing and arithmetic make it possible for him to continue to use these skills towards his own and the community's development and for active participation in the life of his or her country" (Keeves & Bourke, 1976, p.6).

Literacy has meant different things at different times and in different places. The modern term "literate" and "illiterate" are both derived from a Latin word *literatus*, which for Cicero was a learned person. In the middle ages literatus was one who could read, write and perhaps speak Latin (Stock, 1983). It is evident that literacy is a term that entails aspects of reading and writing as described by Lind & Johnson (1990). It includes such variation in its levels over functionality as defined by Gray (1956): "... a person is functionally literate when he/she has acquired the knowledge and skills in reading and writing which will enable him to engage actively in those activities in which literacy is normally assumed in his culture or group" (p. 19). According to the International Educational and Evaluation Association (IEA) report (Elley, 1992), functional literacy has great attraction because of its adaptability to a given cultural context. Wagner (1992) stresses this point when he says that: "... the use of the term functionality, based on norms of a given society, is inadequate as a universal definition precisely because adequate norms are so difficult to establish" (p. 3). Therefore, it is clear that a broad based conception of literacy is needed not only for a valid understanding of the term, but also for coming up with appropriate policy actions (cf., Venezky & Ciliberti, 1989; Purves, 1987). On the other hand, reading literacy is normally left undefined although it is a major component of literacy that requires a definition.

According to Venezky (1987) "... literacy qua literacy is a cognitive skill, categorically similar to numeracy, bookkeeping, and chess playing". He explains, "... this does not deny literacy's socio-political dimension, but instead reinforces the relevance of psychology to the study of literacy acquisition and performance" (p. 5). As a cognitive skill, literacy may be viewed as two related complex processes: reading and writing. For the former an enormous research literature is available, from which some empirical conclusions can be drawn. For example, the processes of reading may be categorized into two levels: (1) a set of lower-level skills for detecting and recognizing letters and other word parts, and for assembling these into wholes for matching against an internal lexicon, and (2) a set of high-level skills for deriving and integrating meanings (cf., Venezky, 1987). Perfetti (1985) stresses that for an efficient reading the lower level skills must work rapidly

and autonomously, and the higher level skill must integrate local and global text information from long term memory.

Elley (1992) states that for the inclusion of all countries in the IEA study, reading literacy is defined as, "... the ability to understand and use those written language forms required by society and/or valued by the individual" (p. 3). He continues to elaborate on the meaning by saying: "The emphasis on language forms required by the society reflects the concept of functional literacy and coping with reading tasks frequently encountered in an organized society - reading notices, newspapers, maps, graphs, and government circulars". Elley notes that an additional dimension of reading literacy was imperative to cater for higher-level thinking and interpretation of narrative prose and magazine articles, hence, the need for the individual (Elley, 1992). (see the section: Definition of Terms).

Furthermore, research has not only been focused on literacy achievement but also on reading interests and activities (Guthrie, Schater & Hutchinson, 1991). This is because those who are termed as knowledgeable in communities, religious or professional associations and decision makers read more frequently and more intensively (Reder & Green, 1983). As to such, this study seeks to identify how reading literacy including reading activity relates to success in terms of academic achievement in a Kenyan setting.

A number of historic and comparative studies have been done on literacy (Wagner, 1992). What is impressive in historical accounts about these studies is the importance reading and writing, often as separate activities, have been given over the centuries. The fact that clergymen of the world's great religions were also the possessors of one or both of these skills signifies not only the sometimes restricted nature of literacy but also its social and moral power as well (Goody, 1968). Clearly, what might be termed religious literacy was the predominant form of reading and writing activity since the time of the ancient Greeks through the middle ages. Therefore, the history of literacy parallels that of social history such as religion, public schooling and the establishment of democracy (Wagner, 1992). Latest attempts to link mass literacy with economic

development has become a matter of increasing debate among researchers (Clanchy, 1979). However, it has long been accepted that the rise in literacy and educational levels were basic causes of economic growth.

Some of the current research seem to contradict such an assertion by giving such examples of countries like Sweden and Great Britain. While the former had high literacy rate before the industrial revolution, the latter had rather low rates of literacy even during the periods of its rapid economic growth (Clanchy, 1979; Wagner, 1992). At the same time, in most of the developing countries where there is an alarming rate of illiteracy, studies indicate that literacy is a basic tool in all forms of development (Lawrence, 1992). A person is regarded as an active participant in nation building if he/she can have a good academic achievement which is deeply rooted in one's ability to read and write (Mulira, 1975 ; Riria, 1983). The recent IEA Reading Literacy study reported by Elley (1992) validates the fact that reading literacy performance among some developing countries is lower in relation to industrialised countries. Among the developing countries in Elley's study there were a few African countries like Zimbabwe, Nigeria, and Botswana which have served as pointers to this research.

Historical Perspective on Reading Literacy Research

Through the ages of educational development, reading literacy and psychology have been inseparable.

Although literacy is understood to be inclusive of both reading and writing abilities, there are few studies cited on the latter. Venezky (1984) states that formal assessment of reading as a cognitive activity originated in the 1880s in the Leipzig psychological laboratory. He argues that there was greater focus on reading literacy when Cattell (1886) attempted to measure speed and nature of mental events (Venezky, 1984). He concludes that although reading was not the primary focus of Cattell's research, the importance of the idea of word and letter perception and the standardization of tasks to measure this perception can not be overestimated in the further development of reading assessment.

Rice (1894) introduced reading as a major tool of assessment of educational achievement in the United States of America. By 1914 his ideas on reading achievement were generally accepted and more of such surveys were well under way (Venezky, 1984). Early in the twentieth century, it was evident that emphasis was put on testing to make psychology worthy of the term science. It was also due to the then increasing number of children enrolment in educational programmes and the press for accountability (Landes & Solomon, 1972).

In Scandinavia, Sweden is unique in its history of reading assessment. Lundberg (1991) and Venezky (1984) indicate that there was a very demanding reading examination programme conducted by The Swedish Church as early as 1680s. Reading ability was pressed on the population by church and state to ensure that everyone could "read, sing, and pray the holy Word of God from the books printed in the Gothic type" (Johansson, 1987, p. 66). Fines were levied on parents who failed to teach their children how to read and write. Adults were also denied communion and marriage rights if they could not read and recite the catechism. Reading ability rose above 90 percent during this period in Sweden because of such demanding conditions. This form of literacy, however, like the semiliteracy which was based upon reading promoted by the Catholic church in the nineteenth century in France (Furet & Uzouf, 1982), did not represent an individual response to social needs. The imposition was from the church and state in order to preserve tradition instead of adjusting to the then new needs of the society. Surprisingly, even today literacy is used by some primarily to confirm cherished beliefs instead of gaining access to new ideas and information (Heath, 1980).

Although it is clearly demonstrated that there was significant success in developing reading assessment procedures during the first decades of this century, there is evidence as well that there was resistance from teachers. However, administrators maintained the programmes because of the accountability function of the tests (Downey, 1965; Resnick, 1982). It was for this reason that Thorndike in developing his prototypical test might be considered as the father of modern group tests in reading (Sulzby et al., 1984).

Reading research is as old as experimental psychology (Cattell, 1886). It has been systematised into three major areas: an emphasis on the reader as an active information processor; the development of comprehensive systems of discourse analysis that could be applied to reading; and an increased interdisciplinary interest in precisely translating research into practice such as considering the impact of research findings that can be related to various subject areas as English, Mathematics, Science etc. in natural classroom settings (Fredericksen, 1975; Halliday & Hassan, 1976; Kintsch, 1974; Kintsch, 1978; Thorndyke, 1977; Kamil, 1984). Of these three areas, an increased inter-subject area approach i.e., translating research into performance on subjects taught in classrooms is of major interest in this study, specifically, how reading literacy is interrelated with the different subjects in academic achievement (see Daneman, 1991).

Benefits of Reading Literacy

Most countries have language laws based on ethnic/dialect groupings or pre-/post colonial history where some common language is used as a vital tool for national development. Thus, there is always a language referred to as official and/or national for national unity and development purposes. It is due to such fundamental goals that reading literacy research is as dynamic as development at either national level or internationally (Dutcher, 1982). It is not a wonder, therefore, that international bodies like the United Nations spend research funds to eradicate, one of man's greatest obstacle to development, illiteracy. Malmquist (1992), emphasizes that literacy is a unique instrument to release the rich potentials of inner man, his/her feeling of joy, love and care - the rich feelings, which give life its fullness. According to Randhawa (1987) literacy, especially the reading aspect, regardless of academic debate, appears to have the following positive effects:

1. It makes it possible for people to release and build diversity of opinion and intellectual ferment. Really, its cognitive consequences are considered possible through the development of subjectivity. That is, going beyond the information in the text, interpreting, evaluating, contrasting and so on (Clifford, 1984; Olson, 1986).

2. It has led to the challenge of traditions built on ignorance. The empowerment of the individual which is portrayed in his/her creative and critical problem solving is thought to be instrumental in dismantling indefensible traditions. For many, reading literacy is a liberating experience, although it must be understood that both of these first two effects are context dependent (McPhail, 1987).

3. It fosters individuals capacity for self education and reflection. This effect has the potential of personal benefit and exploitation. The availability of information technology to the literate and the opportunity to use critical analysis in dealing with modernity provides a conducive environment for individuals to enhance their potentials (Ost, 1985).

4. It has a value to the community, for self- and socio-economic worth, mobility, access to information and knowledge, rationality, morality, orderliness are among the many qualities linked to literacy (Graff, 1981).

On the other hand, there is a flip side to the positive effects discussed above. Smith (1989) argues that we are overselling the benefits of literacy and expectations which are unwarranted. In particular, he states:

"My concern is with the extravagant claims that are made for literacy and with the inflated manner in which literacy instruction and literacy research are frequently discussed. The way in which reading and writing are frequently promoted, taught and researched destroy the literacy that we are trying to create and discriminate against those whom literacy is supposed to liberate and enlighten" (pp. 353-354).

Fallacies in attributing too much to literacy

Is literacy by itself a golden key to everything from full employment and reduced crime rate to the treasures of world literature and culture? Randhawa (1989, pp. 64-65) points out the following fallacies:

1. Literates are not necessarily better persons than illiterates. Historic evidences suggest that some of the ruthless tyrants of the world were avid readers and excellent writers. Similarly, there is no convincing evidence which shows that making people literate

would prevent them from engaging in criminal activities. There is no cause and effect relationship between crime and literacy. If anything, making illiterate criminals literate would make the situation worse because they would be more efficient and sophisticated. On the other hand, reading literacy might help them find a respectable position in the society.

2. Literacy does not engender finer feelings or higher or better values. Nor does it guarantee that people are going to be better.

3. Literacy does not make people more intelligent. Scribner and Cole (1978) demonstrated that people who had not attended school at all could think just as well as those who had gone to school for a number of years. This research was aimed at determining the cognitive consequences of literacy among the Vai, a small traditional group in Liberia. This tribal group uses an indigenous syllabic writing system exclusively for letter writing to friends. Scribner and Cole (1978) found no major differences between the schooled and the non-schooled on a variety of cognitive tasks.

4. Literacy does not guarantee work, any more than learning to drive guarantees that one will get a car.

5. Those who have learned only the basic skills of reading and writing may not be considered literate - if literacy is regarded as the ability to make use of the possibilities of written language.

In addition Olson (1994), like Wagner (1992), also notes that there is more to be said on the effect of literacy than the traditional view that it has immediate consequences. He brings in the concept of time and its effect of literacy. He points out that it appears that although literacy is a cultural resource that may lead to substantial change in development, it is bound to the examination of its influence by looking at its historical impact. He purports the notion that not all that is apparently useful proves its usefulness given time. For example, he states: "... writing may permit the listing of the laws of the culture but merely teaching someone to read and write is not going to make them immediately better at drafting law codes. A historical process must intervene" (pp. 41-42).

There is also an additional thought mentioned by Olson when he discusses literacy and schooling in his book, "The World on Paper". While citing the works of Scribner and Cole, he reiterates that effects of schooling are discourse related as opposed to literacy. For

example, treating a sentence as a premise in an inference task is more of a discourse than literacy related. But he admits that, others including Goody, have argued that what matters is that even in such discourses referred to as exclusive of literacy, there is literacy component; whether spoken or written is of no significance.

Olson (1994) however leaves room for future research to come up with more specific hypotheses that can deal with the questions that relate literacy to thinking.

It seems quite reasonable for a country and international bodies to diagnose reading literacy and its potential implications on areas such as academic achievement. It is within this context that this study is geared towards Kenya.

Theoretical Background of the Study

There are various theories on reading acquisition and processes. Literature on the subject reveals such theories as on word recognition, a schema-theoretic view of basic processing in reading, orthographic representation in word perception, phonologic processes etc. However, the present study deals, particularly, with reading literacy as an already acquired skill considering background factors that may have influence on the role reading literacy plays in relation to the way a student performs in school in terms of academic achievement based on societal expectations.

With the publication of Scribner and Cole's (1981), "The psychology of literacy", the theory that literacy could account for broad-based social and psychological changes set out in the revolutionary writings of Goody (1978), Havelock (1963), and Watt (1957), at least in many people's eyes, laid to rest. The introduction of script, they found, produced no general cognitive effects such as the abilities to memorize, classify, or draw logical inferences. The source of significant cognitive change, if indeed such changes occurred, had to be sought elsewhere such as in altered social conditions or in the process of schooling (cf., Olson, 1994).

Some writers have been tempted to take Piagetian stages as a model for cultural state, suggesting that some cultures are concrete, others formal in modes of thought (Hallpike, 1979). In as much as the parallel is suggestive, it is also misleading. The fact that cognition develops through a series of transformations in childhood is no argument for the hypothesis that cognition among adults has a similar history. One thing is certain, "while children's development is viewed as progressive, cultural differences do not represent stages on a universal scale with Western culture at the top" (Olson, p. 21). Stable cultures are all "mature". For another, the metaphor offers nothing that would causally explain the parallel. While it is obvious that different people and different cultures hold different beliefs, it is not obvious that they have different ways of thinking about their beliefs. Human cognition and human rationality, are always and everywhere much the same. Then, cognition does not have a history, hence, a theory connecting cognition and literacy is logical. Despite the existence of cognition as an innate ability, there is a need of the context specific expression of such indicators of cognition as reading literacy and writing (literacy) (Olson, 1994; Goody, 1987; Scribner & Cole, 1981).

There are a number of studies that have been conducted on reading literacy or on academic achievement as individual areas of concern either in education or psychology. Some of such studies have focused on reading achievement and factors that may influence reading literacy (see, Elley, 1992, 1994; Lundberg et al., 1991, 1994, 1995; Postlethwaite & Ross, 1992). Some other studies have also been geared on mental abilities and performance on academic subjects (Carroll, 1993; Gustafsson, 1994, 1995, Rosén, 1995). Furthermore, there are researches that have dealt with reading literacy and performance on academic achievement (Daneman, 1991; Bloom, 1976). There have also been consistent trials to see if gender difference plays a role on such studies as reading achievement (Gates, 1961; Hyde, 1990; Hogrebe, 1985; Jacklin, 1989; Linn, 1985; Lundberg, 1991; Lundberg & Rosén, 1995; Thompson, 1975; Wagemaker, in press; Munck & Taube, in press). An attempt is made in the following section to review related literature on background factors that contribute to variation in reading and academic achievements and the findings of those studies.

The conceptual framework model in the present study has been formulated with an effort of seeking to determine the relationships among some background factors that are assumed to influence reading literacy; to the extent that reading literacy in its deeper aspects (like general reading ability and documentary) may have impact on academic achievement which is assumed to be hanging on two basic abilities, namely verbal and general reasoning abilities. However, before presenting this conceptual framework, first, a few general remarks will be made on reading literacy and background factors, reading literacy and academic achievement, gender differences, and school location.

Reading Literacy and Background Factors

The issue of literacy can be understood in the context of the basic learning needs of children and adults and the specific circumstances for social and economic development involved (Foster, 1987). It is useful to remind ourselves that illiteracy is not an isolated social phenomenon either in its consequences or in its causes. Rather, the distribution of illiteracy in a nation follows certain typical patterns. There is high concentration of illiteracy, in both developing and industrialised countries, among ethnic and cultural minorities and the poor - those who are outside the mainstream of society. Looking at the pattern of illiteracy in a nation, one cannot but conclude that the degree and persistence of illiteracy reflects structural imbalances in a nation, such as the uneven distribution of political and economic power, the uneven way in which political and economic policies and priorities are determined, and the uneven way in which the systems and institutions implementing those institutions are organized (Ahmed, 1992). The sad irony of illiteracy is that those who most need access to knowledge, information, and skills, by which they might put themselves out of a disadvantageous situation, are the ones deprived most of this access. The tendency for this legacy to be passed to one's children, in turn, aggravates the situation. There is a well established connection between the illiteracy of parents and the failure to enrol in school as well as early primary school drop-out (Rivlin, 1975). There is also a well documented relationship showing negative and positive correlations among the literacy levels of the parents and the size of

their families, mortality, nutritional status, and the academic achievement of their children (Mitchel, 1986; Wallat, 1987; Glass, 1987). Literacy as a cognitive tool has no doubt given rise to personal or national growth, self-sufficiency, and economic achievement among cultures although we should keep in mind also a critical position on the benefits of literacy.

Ahmed (1992) states: "Effective primary education for children and the use of all channels of communication and education to create a learning society are essential conditions for nurturing a culture of literacy" (pp. 33-34). This makes reading literacy as already defined to be a basic goal that if accomplished by the help of parents, teachers, students and policy makers may enhance performance of the individual in such an area as academic achievement (Langer, 1987).

The goal can be unrealistic unless attention is focused on some factors that possibly influence reading literacy either directly or indirectly. These factors may include: home and school conditions, socio-economic level, students' voluntary reading, and reading opportunities just to mention a few.

Home and school conditions

It is apparent that over the years studies have identified some home variables that either have direct or indirect influence on reading behaviour. These may be cited as: parental interest in reading (Clay, 1976; Comer, 1984; Neuman, 1986; O'Roukre, 1979; Spiegel, 1979), provision of space and opportunity for informal literacy socialization such as access to books and print (Gorman et al., 1981 & Greaney, 1980), parental reading habits (Morrow, 1983; Spiegel, 1981), reading with the child (Hess et al., 1982) and parental education (Morrow, 1983).

Postlethwaite and Ross (1992) in their study on the effectiveness of schools on reading present four reasons why schools have impact on achievement. Schools are considered to offer good conditions for achievement if they are: situated in privileged areas where there are well informed parents who offer to the students stimulating

environments for education; equipped with learning facilities; having good teachers; and good administration.

It is for these reasons that home and school conditions factor is included in the study as a possible factor that may influence reading literacy prior to schooling as well as during the course of schooling.

Reading Opportunities

Library membership among children appear to reflect parental interest and use of libraries (Hegarty, 1978). Studies seem also to indicate that children who are consistently active readers have within their reach both the materials and the opportunity to read. Evidences from research (Taylor, 1983; Neuman, 1986) show that those children who have books readily available to them read better than those that have less of such privileges. Further, a number of studies suggest that much of children's reading for leisure take place in their bedrooms, especially in bed (Fielding, 1986; Price, 1987). Other studies have also established that regular library usage correlates significantly with the number of books read (Heyns, 1978). Hence library access and use may be an important factor in this study both as a determinant of reading achievement and as an indicator of reading achievement.

Socio-economic status

A number of studies have established that reading literacy is related to socio-economic status (Walberg & Tsai, 1984). That is, the affluence of a family, family size (Greaney, 1980), education and living conditions seem to correlate significantly with reading achievement (Ingham, 1981). The social-cognitive hypothesis which is consistent with Vygotsky's notion of the development of cognitive abilities may be applied here (Vygotsky, 1978). He proposed that the inter-individual cognitive and social interactions that occur during shared problem solving are gradually put to practice by the learner. For instance, situations where reading literacy serves as a guided activity by a society hence provide an individual with a position in such a society (Rogoff, 1990; Vygotsky, 1978). For example, being requested by an illiterate for help to read a letter, is a symbol of

earning a social status. This makes the social factor one among background factors that may influence performance on reading literacy to be explored in this study.

Student's voluntary reading

Student's voluntary reading here refers to the student's reading interests and habits.

Most education systems emphasize voluntary reading as an important objective, and the majority of teachers rate highly the instructional aim of fostering student interest in reading (Elley, 1993). Previous international surveys have used questionnaires to make comparisons across countries between students' attitudes and achievement, and consistently positive relationship have been established (see Thorndike, 1973; Purves, 1973). Guthrie and Siefert (1984) summarized a number of surveys and they found many uniformities in the reported purposes of students' reading across age groups and nations.

In most countries, studies on reading interest and activities indicate that girls read more than boys, and they read a wide range of topics. However, according to Elley (1993), there should be a concern among educators that students' reading activities out of school is declining at an alarming rate in line with the rise of television, videos, and computers.

Research has also established that the level of reading is related to the level of student comprehension (Wigfield, 1978) and the time spent by kindergarten children looking at books (Morrow, 1983). When children are presented with interesting reading materials, there is evidence to suggest that the interest factor contributes more to the variance in recall than measures of readability or verbal ability (Anderson, Mason & Shirley, 1984). According to Santa and Alverman (1991) a student's personal interest, as a self-initiated motivational factor may be regarded as the most fundamental to reading literacy. It is therefore inevitable to investigate this relationship in this study.

Reading Literacy and Academic Achievement

Reading literacy in essence belongs to the verbal domain, although in practice reading is a key skill in almost any cognitive task. Considering the traditional way research has been on cognitive abilities, reading has not been interpreted as one or several independent abilities, but rather as a reflection of several underlying cognitive abilities, depending on the reading material used in the study (Lundberg & Rosén, 1995).

It has been natural to connect any skill underlying reading different types of texts to the domain of individual differences in cognitive abilities. Nowadays, the most popular theoretical model of cognitive abilities relies heavily on an empirically hierarchical three-level model (Carroll, 1995; Gustafsson, 1988, 1994). At the top of the pyramid, there is a general (fluid) intelligence (Gf) influencing all the cognitive processes. According to Rosén (1995) Gf is reflected in tasks requiring abstraction, concept formation, perception and eduction of relations. It is supposed to represent biological factors and incidental learning on intellectual development. It is also involved in primaries such as induction, general reasoning, and cognition of figural relations. This level will later be referred to as a general reasoning ability. The intermediate level comprises of rather broad dimensions which are defined as crystallized intelligence (Gc) which is shown in tasks requiring abstraction, concept formation, perception and eduction of relations too but where the stimulus material is primarily of verbal-concept in nature. Unlike Gf, it is established through cultural pressures, education and experience. There is also a General visual (Gv) ability. It is involved in visualizing the movements and transformation of patterns, maintaining orientation with respect to objects and locating and configuration in a visual field. At the base of the pyramid, a large number of narrow ability dimensions have been identified as influencing rather specific cognitive tasks (Lundberg & Rosén, 1995; Rosén, 1995; see also Carroll, 1993; Gustafsson, 1988, 1994).

The hierarchical model presented above implies that instruments which are used to capture cognitive achievements are influenced by

all dimensions which appear in a hierarchical structure above the variable. Each instrument is therefore an indicator of several dimensions. However such a model may be reformulated by an orthogonal model with nested factors (NF-model). In this kind of model , it is immediately seen that every observed variable is complex in the sense that it is related to more than one latent variable (see Rosén, 1995; Gustafsson & Balke, 1993). This NF model approach will be used in Chapter Five.

According to Lundberg (1991) reading literacy has an interactive and constructive nature in the sense that it is a product of cultural evolution that relies on cultural transmission for its existence (Lundberg, 1995; Lundberg & Høien, 1991). It is logical to assume that reading literacy is affected by general intelligence to some degree, by crystallized intelligence to a greater level, and by several more narrow dimensions depending on the type of reading task. Reading literacy may also be given a broader definition than word recognition and comprehension (Lundberg & Rosén, 1995), under conditions in which an individual also, has to decode and comprehend material with figural or pictorial content. With an even broader definition, it is reasonable to assume that reading skills reflect certain verbal abilities, which may be referred to as general reading ability, and narrower domains, for example, specific ability domain required for document reading.

It is hardly not an overestimation to state that successful reading is a key factor in education. The reader is an active participant in constructing meaning through the integration of existing knowledge and new knowledge from the text. The latter process is a crucial prerequisite to achievement in most academic disciplines (as English, Home Science, Geography, Kiswahili, Mathematics, Music and Science, just to mention a few).

Studies indicate that people who are unskilled at reading are denied, or at the least limited in their ability to acquire information from a written text; nowhere is their handicap more evident than in academic settings (Bloom, 1976; Perfetti, 1976). According to Daneman (1991), individuals with low reading achievement have low academic achievement as well. Furthermore, reading

comprehension seems to account in large part for the high correlation in performance between reading and different school subject areas (Bloom, 1976). It is especially surprising that schooling does not reduce the differences among individuals in their reading ability (Just & Carpenter, 1980). To the contrary, individual differences are pervasive and persistent and, if anything, become more pronounced with more years of schooling (Daneman, 1991). Relevant hypotheses that relate reading literacy, academic achievement and possible the background factors in this study will be stated later (see The Problem of Study).

Reading Literacy and Gender Differences

The existence of gender differences in mathematical performance, particularly at a higher level of the ability continuum, is well established, whereas empirical support for gender differences in reading is more equivocal. Hogrebe, Newman, and Nist (1985), noted that studies in the 1930s and 1940s failed to obtain gender differences at both the high school and elementary school levels. Similarly, Hyde and Linn (1988) concluded that despite an apparent consensus about gender differences in verbal ability favouring females, the differences are so small that gender differences in verbal ability no longer exist.

Although the existence of gender difference in mathematics is favouring boys, particularly at higher levels, differences in reading seem to be small or non-existent (Hogrebe, Nist, and Newman, 1985; Hyde & Linn, 1988). Jacklin (1989) in her review of literature in the field of developmental psychology concluded that; "In summary tests of intellectual abilities have differentiated girls and boys less and less over the last decades" (p. 128) and consequently; "... gender is not an important variable in the measurement of intellectual abilities. One would expect to have less and less focus on gender in the future research in this area as reports of sex differences in abilities become less frequent (Jacklin, 1989). Similarly, in a review of sex differences in reading attainment, Thompson (1975) concluded that while a larger proportion of males than females make a slow beginning at learning how to read, gender difference disappears by the age of ten years. However, dramatic differences

were noticed by Kinkaid and Klein (1990) in a study where 40 boys and 40 girls were examined on the effects of age, gender, and cognitive tasks on three types of reading recall task. Boys were found to perform better than girls on cued recall conditions, whereas girls were better on the unstructured recall task.

Although studies on gender differences have their origin in North America, scarcity of literature addresses the question from an international perspective. The key problem is: Is the apparent invariance in the findings in the literature which reports no differences or small differences favouring girls, also true for other countries? Johnson (1973) studied sex differences in reading achievement among four English speaking nations (England, Nigeria, Canada and USA) and found that boys scored higher than girls in England and Nigeria whereas girls generally scored higher than boys in Canada and USA.

Gender differences in reading have been explained in many ways including: physiological accounts with a particular focus on differences on brain function (Harris, 1976); socio-cultural reasons especially differing sex role expectations (Gates, 1961; Downing, 1979); cross-cultural differences (Johnson, 1973) and the extensions to the socio-cultural argument provided by cross cultural studies.

Gender differences have also been reported in the latest IEA Reading Literacy study (Elley, 1994; Munck & Taube, in press; Wagemaker, in press). For example, Wagemaker (in press) found a consistent pattern of females superiority at both age levels (9- and 14-year-old), with the differences diminishing towards adolescence. This pattern seemed to hold true for both high-achieving and low-achieving countries.

Studies in USA, England and Wales, Scotland, Sweden, Ireland, and Singapore indicate that girls tend to devote more time in reading than boys (Robins, 1973; Whitehead, 1977; Maxwell, 1977; Flodin, 1982; Greaney, 1980; Gopinathan, 1978). Whereas girls tend to read more in general than boys, some studies indicate that boys read more comic literature (Flodin et al., 1982; Greaney, 1980). Boys also appear to be superior to girls in newspaper reading. The

differences between the sexes in time spent reading books seems to increase with age; by the age of 14 or 15 more than twice as many girls as boys had read books for pleasure "yesterday" (James, 1987).

The situation among most of the developing countries is that girls make up about 50 percent of the total enrolments at the primary level. However, the drop out rate among girls is higher than that of the boys by the end of the third grade (Lind & Johnston, 1990). It is important to examine gender difference in reading literacy and academic achievement to see if it is an indicator among the 14 year old students in Kenya's cultural setting.

Location of the School

An *urban centre* is a town with a total population of over 2000 inhabitants. Based on this definition of the United Nations, Kenya has over 50 urban centres. During the last two decades, there has been urbanization taking place in the country. Consequently, the living standards of quite a few Kenyans has risen in terms of living in good houses, using clean water, having electricity, telephones, and access to better educational facilities. The common feeling that the educated are not suited for rural areas and owing to many university graduates from the eight major universities yearly, living in an urban centre is more admirable (Nyaundi, 1993).

An IEA study reported by Postlethwaite and Ross (1992) indicates that the location of a school plays an important role as a background factor on reading achievement. They noted that urban schools had comparatively better performance on reading literacy tests than those from the rural areas. In this research an attempt will be made to find out as well if there exists gender difference in reading achievement according to the location of the schools.

Although gender differences in reading achievement were not discussed in the study by Postlethwaite and Ross, it will be explored in the present study because there seems to be a cultural tendency in favour of boys in Kenya (see Chapter Three: The Problem of Study).

Chapter Two

Kenya: System of Education

General Background

Kenya is a country on the East African Coast, with a land mass of 582,646 square kilometres (Sweden's land mass of 450,000 square kilometres is smaller but together with Denmark they are about the same size as that of Kenya). To the north it is bordered by Ethiopia, to the north west by Sudan, to the west by Uganda, to the south by Tanzania, and to the east by Somalia. It has a coastal line of about 400 kilometres along the Indian Ocean. Kenya is a land of contrasts: coastal lowlands to the plateau, highlands to the great Rift Valley to the largest fresh water lake in Africa, Lake Victoria. The highlands are bisected into the western and eastern by the great Rift Valley. The Eastern Highlands comprise of Mt. Kenya (the second highest mountain in Africa) and Aberdare Ranges which rise to 5200 meters and 2992 meters, respectively, and the western highlands rise to the highest peak of 4321 meters at Mt. Elgon.

Kenya has a five tier regional administration system which it inherited from the colonial British rule. The country is divided into eight provinces: Central, Coast, Eastern, Nairobi, North Eastern, Nyanza, Rift Valley, and Western. Each province is further divided into districts. The next lower hierarchy are the divisions, locations, and sub locations. (See Figure 1).

According to the 1989 population census Kenya had a population of 21.4 million people. This population was projected to rise to 22.9 million by 1990 with a growth rate of 3.4 percent. The growth rate has declined since the 1970s and early 1980s owing to a successful population education program and family planning strategies by both governmental and non governmental organizations. However, 50 percent of the population is made up of youth under the age of 15 years. This explains to a large extent the insatiable demand for education and the continuing need to expand educational facilities (The Government of Kenya, 1991).

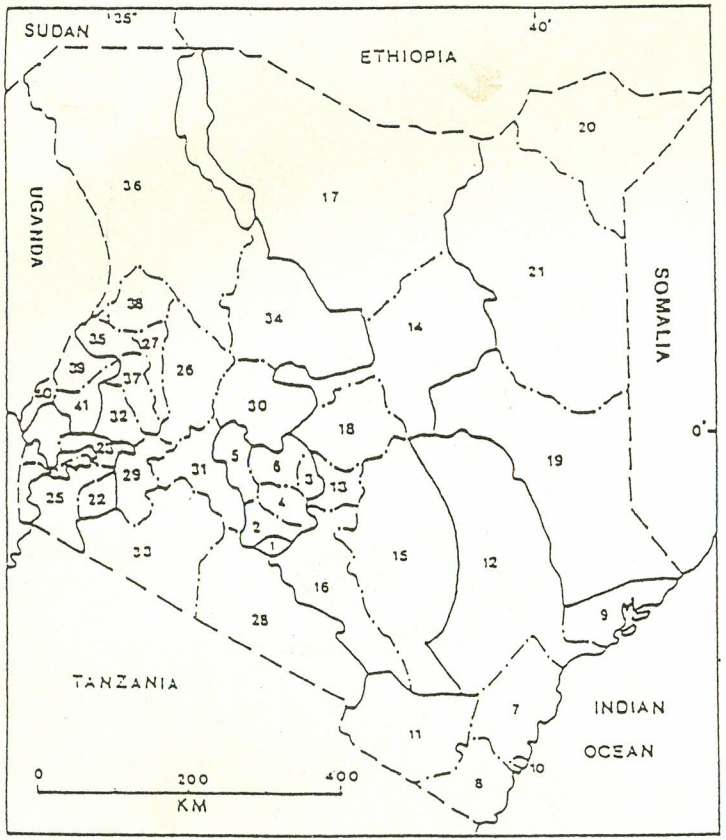

Figure 1. Regional Administrative Structure.

Districts:

1. Nairobi

Central Province
2. Kiambu
3. Kirinyaga
4. Murang'a
5. Nyandarua
6. Nyeri

Coast Province
7. Kilifi
8. Kwale
9. Lamu
10. Mombasa
11. Taita-Taveta
12. Tana River

Eastern Province
13. Embu
14. Isiolo
15. Kitui
16. Machakos
17. Marsabit
18. Meru

North Eastern Province
19. Garissa
20. Mandera
21. Wajir

Nyanza Province
22. Kisii
23. Kisumu
24. Siaya
25. South Nyanza

Rift Valley Province
26. Baringo
27. Elgeyo Marakwet
28. Kajiado
29. Kericho
30. Laikipia
31. Nakuru
32. Nandi
33. Narok
34. Samburu
35. Trans Nzoia
36. Turkana
37. Uasin Gishu
38. West pokot

Western Province
39. Bungoma
40. Busia
41. Kakamega

There are about 42 local ethnic/language groups in Kenya. In addition to these, there are a number of other languages spoken among the migrant communities, such as Hindu and Gujarati among Indians, and Urdu among Pakistanis. The education system endeavours to preserve and promote the rich culture, values, and heritage transmitted through these languages. The language policy states that the mother tongue, within the catchment area of a school, be used as the language of instruction in pre-school, the first three years of primary, and adult education programs (Kinunda, 1994).

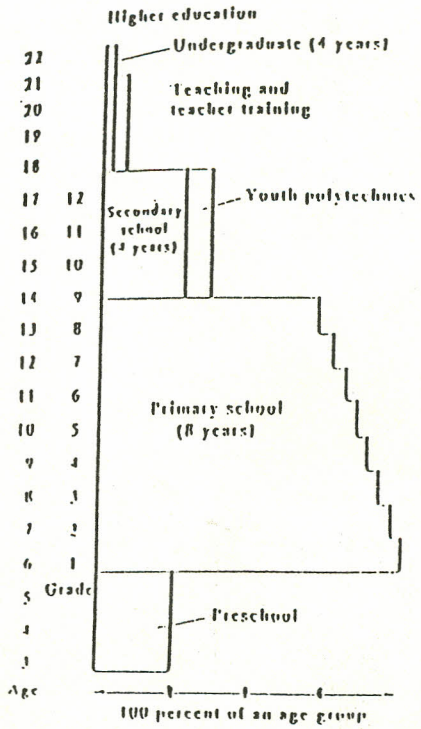

Figure 2. A structure of formal education system in Kenya.

English is the official language and the language of instruction from the upper primary level to the secondary and higher levels of education. That is, all the students at upper primary and beyond are, at least, bilingual. Kiswahili, the national language, which is used widely all over the country and the whole of East African region extending as far as the eastern part of Zaire, is taught as a compulsory subject and second language at both primary and secondary levels of the educational system.

The government of Kenya is committed to ensuring that all citizens participate meaningfully and effectively in the social, political, and economic development of the nation. One key factor that has been identified by the Kenyan government to develop national unity, ensuring freedom, and human dignity to every individual Kenyan, is by having an educated population (Government of Kenya, 1991).

Formal system of Education

Education in Kenya has undergone tremendous growth and expansion in terms of educational institutions and enrolment at all levels. In 1963 when Kenya achieved its independence from Britain, there were 6,058 primary schools, 151 secondary schools and one public university. In 1991 there were 17,650 primary schools 2,647 secondary schools, four public and 11 private universities. In 1991 there were 7 million youths enrolled in various educational institutions as compared to 1 million in 1963 (The Government of Kenya, 1992).

Following the recommendation of the Report of The Presidential Working Party on the Second University (1981) there has been a new system of education unlike that inherited from the colonial powers, the 8-4-4 system of education. This system consists of eight years of primary education, four years of secondary education, and four years of tertiary education, depending on the discipline and the duration of the particular training (Presidential Working Party, 1981). A structure of the current formal system of education is presented in Figure 2 as adopted from Kinunda (1994). (see Figure 2).

Primary education starts for most children at the age of six years. In 1991 there were about 5.5 million enrolled in primary education. The national participation rate was 96 percent in 1991 of the children within the age group of 6-14. However, only 69 percent of a given cohort reaches Standard 8, at the end of primary education. Girls make up 48.7 percent of the total enrolment but there are disparities in gender between provinces. During the same year the enrolment at the secondary school was 614,161 - 27 percent of the relevant 14-18 years age group. The enrolment of university students in the four public universities was 41,674 during the 1991-92 academic year. Only 2 percent of those joining formal education system make it to higher education because the universities cannot admit all the students who qualify due to limited facilities. However this level of education registered a growth of 4.9 percent in 1991 (UNESCO, 1992).

Curriculum and Teaching Methodology

The Kenya Institute of Education is the body charged with the responsibility of preparing the national curricula for pre-primary, primary, and secondary education, teacher education, technical institutes, and adult education. The universities, through their senates, develop their own curricula. Curriculum development is a participatory process. Participants are drawn from the relevant subject inspectors, teachers, representatives from the Kenya National Examination Council, curriculum specialists from the Institute of Education and interested parties from governmental and non governmental organizations.

All children cover a common curriculum nationally at the primary level. This includes languages (English and Kiswahili), mathematics, science, agriculture, social studies, art and craft, music, and physical education. At this level all these subjects are taught by a general classroom teacher except for the upper classes where there are specialist teachers who use a variety of teaching methods like lecture, group work, project and take away assignments. There is however inadequacy of text books in many schools so the pupils share the few textbooks available in groups.

This means also that the teacher is the main source of knowledge most of the times.

The secondary school curriculum, however, is more diversified. The main disciplines are: communication, mathematics, science, humanities, applied education, and physical education. The students are examined in at least eight subjects of which English, Kiswahili, mathematics, biological and physical sciences, geography, history, and government are compulsory. Students must also choose a practically oriented subject and/or religious education. Foreign languages are mainly introduced at the secondary level. The popular languages opted for are French and German. Other languages include Hindi, Gujarati, and Urdu but these are taught only in few schools (Kinunda, 1994).

Curriculum supervision is the responsibility of the Inspectorate of Schools but evaluation of the curriculum is ensured through examinations.

The system of Examinations and Educational Assessment

A pupil's performance is evaluated through continuous assessment in class work and tests. There are also end term and end year examinations which are school based. At the end of the primary education, since 1965 there has been a national examination called, Certificate of Primary Education (CPE) which constituted of multiple choice tests in mathematics, English and general paper (science, geography, history, geography and civics). CPE functioned as a selection instrument for further schooling until 1985 when it gave way to KCPE which is thought of as being more relevant to the realities of life school leavers face by offering practically oriented subjects (Home Science, Carpentry , Agriculture etc.) in addition to the then existing curriculum for self employment of the KCPE graduates if they can not continue with their education.

Only 50 percent of those completing primary education join secondary schools which is just 27 percent of the relevant age group. At the end of secondary education students sit for the Kenya Certificate of Secondary Education (KCSE) which is used for

selecting students for university education and other post secondary institutions (UNESCO, 1992).

The external examinations are very competitive because their results determine the fate a student's next move in education or end up only as a graduate of KCPE.

The Kenya National Examination Council (KNEC) is the body responsible for the management of examinations. It is also in charge of certification for primary and secondary education and post school training institutions except for universities and diploma teachers colleges which administer their own examinations.

Educational Finance

Since independence, the expansion of education has been mainly through public funds. As a result, expenditure on education has more than doubled since 1963. In 1963-64, the recurrent expenditure on education was Sh 135,670,000 (USD 2.1 million) or 22.5 percent of the national recurrent budget. The annual national budget allocation rose from 10 percent at independence to 27 percent in 1990-91 for both recurrent and development expenditure (The Government of Kenya, 1964; The Government of Kenya, 1992).
The government per pupil expenditure for primary schools, in 1989, was only 44 percent of a total of Sh 2,100 (USD 32) the rest being catered for by parents or guardians of the pupil; and 27 percent of Sh 7,500 (US 115) for secondary school, while it accounted for 60 percent of Sh 72,500 (US 1,108) per year at the university level. For the teacher training colleges and polytechnics the government expenditure was more than 80 percent of Sh 13,000 (USD 199) and Sh 14,000-38,000 (USD 214-581) cost per student in a year. These expenditures show the priority Kenya puts on wanting to have an educated population (The Government of Kenya, 1992).

Reading Literacy and Research in Kenya

Before the coming of western civilization, there were no recorded literary works that are documented. But oral literacy was prevalent. It was passed from the elderly to the young in every

generation as a means of maintaining the moral values and ethnic identity through stories, folktales and legends. There are records for trade among the Africans and the Arabic world even as far as with the Chinese, Indians, and the Philipinos. Evidence indicates that this trade did not involve any form of reading literacy but instead was done by the use of bartering method in a mixture of the African Bantu languages and Arabic which gave rise to Swahili (Foster and Purves, 1991).

A wind of change struck most of Africa when industrialization was booming in Europe and there was need for more raw materials of which this virgin continent was a major source. Not only did the seekers for raw materials come for trade but ended up with persuasion of the African leaders who did not only exchange raw materials for the already manufactured goods from the west but also their powers in the name of protection to the local authorities from possible ethnic attacks from the neighbouring tribes. As a result, English a language of the imperialists became a major medium of communication in all walks of life (Goody & Watt, 1968). The westerners, however, brought along as well their evangelistic zeal which was the result of the reformation in Europe. So in order to make new converts, reading and writing became a necessity. Hence the start of missionary schools (An interview with a Luo elder, June 1994).

Although the colonialists were not anxious to educate the locals, the few privileged who were chosen to be intermediaries for communication were sent overseas to learn the language of the masters. This group later became the instruments for freedom for the people, for instance, Jomo Kenyatta of Kenya who lead the Kenyans to independence (Jomo Kenyatta, 1975).

With the independence came one of the greatest tasks, fighting illiteracy. An ambitious attempt has been made by the government and non governmental organizations to make Kenyans, young and old alike, literate. According to Tostensen and Scott (1987), a UNESCO estimate put the average rate of adult literacy at 40.8 percent. Kenyan literacy had risen from 20 percent at independence in 1960 to 65 percent in 1987 which is remarkable considering that

the average literacy rate for sub-Saharan Africa is 42 percent. Literacy in this context has been sought with an aim of letting the Kenyan population to be able not only to read and write but also, in a functional way, use this skill in a deeper sense as already defined.

Education has been and apparently will remain one of the chief criterion for determining one's success in Kenya. Especially, reading literacy has come to determine the social position in the sense that it is culturally unacceptable for a youngster to be unable to participate freely in a discussion of the local dailies or to ask an age-mate to assist in reading a letter that has been written by a friend (Interviews with some Kenyan secondary school students, May 1994).

Kenya, like any other developing nation, has a few huddles to encounter. Many studies here are financed by external agencies. The complaint is that these researches better reflect foreign interests, styles, trends, methods than it does the domestic needs and realities (Ryan, 1992). Ryan expands on this by stating that American and European paradigms and protocols are applied or adapted to African or Asian realities. He concludes by saying that the evident need is not to halt research by the foreigners but to complement and correct it with a growing volume of research by nationals.

Indeed the most fundamental problem is not the quality or the relevance of the research but its paucity (Ryan, 1992). Research on learning in schools is limited. The single factor of salaries often accounts for over 90 percent of public educational expenditures. Evidently little remains for books, materials, and equipment and rarely anything at all for research and development. Hence, although studies have been done on literacy in Kenya (Riria, 1983) little reflect research on the cohort for this study.

Due to the apparent importance of reading literacy as evident in the cited literature, it is indispensable to think that it may affect performance on academic achievement. Such seemingly underlying relationships have led to the formulation of the questions of the

problem of study, the conceptual framework, the relevance, and th
hypotheses for this research.

Chapter Three

The Problem of Study

As any other developing nation, Kenya puts emphasis on academic achievement. Naturally, the level of performance on public examinations is a deciding factor on an individual's future participation in nation building. Therefore, an examination of factors that may affect such achievement is of necessity. It is within this framework of thought that the following questions are posed in this study:

1. How do the patterns of relationships and structures among various aspects of reading literacy and academic achievement look like among the 14 year old students in Kenya?

2. Are there any documentary or general reading ability aspects of reading literacy that stand out as predictors of performance among the subjects at the KCPE, namely: English, Kiswahili, Geography, Music, Home Science, Science, Mathematics?

3. How can the variance in reading performance be accounted for by the following factors:

   i. Home and school conditions

   ii. Reading opportunities

   iii. Socio-economic status

   iv. Student's voluntary reading

4. Does the location of the school, either rural or urban, have any influence on performance in reading and academic achievement?

5. Is there a substantial difference between boys and girls in performance on both reading literacy and academic achievement? How can such differences be accounted for, if any?

6. How are the responses of boys and/or girls to the interviews accounted for with reference to reading literacy?

In this research, reading literacy was measured by a reduced version of the IEA-Reading Test for 14-year-old-students (1990) whereas the factors were measured by a modified version of the Student Questionnaire of the IEA-1990. Academic achievement in English, Kiswahili, Geography, Music, Home Science, Science and

Mathematics was measured by KCPE results of the students under the study (For details, see Instrumentation in Chapter Four).

The Conceptual Framework of the Study

A basic assumption in this study was that reading literacy and academic achievement are inter-related. The relationship is perceived as a relevant phenomenon in understanding the learning process of a student and how that process may lead to a desirable end product. Despite a student's wish to have optimal performance in his/her reading literacy or academic achievement, certain background factors are not necessarily within his/her control. These may be such factors as home and school conditions, socio-economic status, and reading opportunities, that determine the home literacy interaction before a student begins formal schooling. Further, it is possible that success in academic achievement is at stake only when a student has a poor general reading ability. Alternatively, performance in each subject, (English, Kiswahili, Geography, Music, Home Science, Science, and Mathematics), may require different abilities such as verbal or general reasoning ability, but with a general reading ability as a fundamental prerequisite to academic achievement. The following figure presents the conceptual framework as discussed above. (see Figure 3).

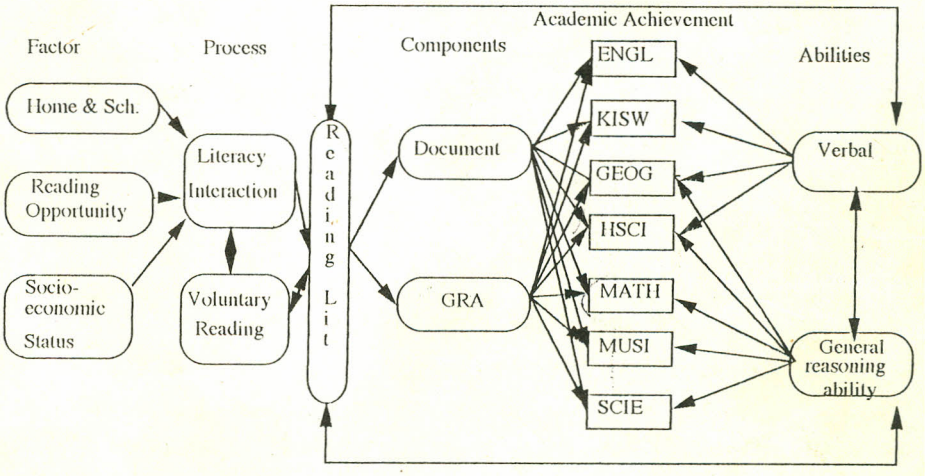

Figure 3. Diagram for the conceptual framework of reading literacy and background factors that may influence its impact on academic achievement.

An effort is made here to explain various components of the conceptual framework model (see Figure 3). First, factors that were presumed to have some relationship with reading literacy. Second, reading literacy and its constituent aspects, and finally academic achievement and abilities that appear to be governing each subject at KCPE.

As discussed in Chapter One, there are studies that have established background factors (home and school conditions, reading opportunities, socio-economic status, and student's voluntary reading) which lead to variation in achievement in reading and academic subjects.

Home and school conditions

Kenya, being a land of variety, is not having only 50 different ethnic groups (tribes) but also differences in its social strata. It has those who are of upper, middle, lower, or below average classes of people in terms of their affluence and civilization. Homes and schools vary considerably on how beneficial they are to reading literacy of a student. Such questions as time students spend on activities as helping with other duties while at home like fetching water or firewood, grazing cattle, watching television, reading for leisure, or thatching teachers' houses, spending time on maintaining temporary classrooms etc. are necessary for understanding whether or not these conditions at home and school foster reading literacy in Kenyan setting.

Reading opportunity

In certain homes, there may be no such a thing as home library, leave alone a communal library. How then would such a situation be contrasted with some urban centres where most of these items (like books in home library and city libraries) seem to be available for reading during and after school hours? It is probable that the disparity of reading resources may have an influence on reading literacy hence reading opportunity as one of the factors that form part of the model in Figure 3.

The number of books at home turned out to be the single most powerful indicator of reading achievement in the IEA study (Elley, 1994). This does not necessarily mean that access to books at home has direct influence on achievement. The amount of books is rather an indicator that reflects the cultural capital which exerts its influence on achievement on reading literacy in a multitude of subtle ways.

Socio-economic status

As already mentioned under home and school conditions, the level of affluence carries with it certain privileges or limitations to a student. For instance, students from wealthy homes may have access to television, study room, availability of electricity leading to having adequate lighting for studies, etc. which may have consequences on the students' reading literacy.

Students' voluntary reading activity

As the other three factors already discussed above, it was assumed in the theoretical framework that given home and school conditions, reading opportunity, and socio-economic status, there remains an important part of the model, students' reading interest and habit which is dependent on the other three factors for its role to be executed effectively in the model. One may have an interest to read but the material to be read must also be available. One may argue that when a student is having good reading literacy level, that in itself, may motivate him/her to read more for leisure. It is also possible that having an interest may lead to reading more and consequently promote a higher reading literacy level.

Reading literacy (as Reading Lit) in the model

How should reading literacy be conceived as part the theoretical model in Figure 3? What is reading literacy according to the model? What are the divisible components of reading literacy that crucially underlie any impact it may have on academic achievement?

In an attempt to answer such theoretical questions, the middle part of the model in Figure 3, illustrates the connections.

Reading literacy should be conceived as the crucial part of the theoretical model, particularly, when it is defined as "the ability to understand and use those written language forms that are required by the society and/or valued by the individual" (Elley, 1995, p. 4).

The definition above can be divided in two parts. One of the parts concerns the "understanding and use". This concept is quite essential for a student's survival in pursuit of academic achievement, especially, in dealing with comprehension, paragraph meaning, knowing of factual information etc. It is also a necessary tool in using reading literacy as a skill in "understanding and using" language forms.

The category of language forms required by the society here refers to those kinds of literacy tasks which are needed to cope with the business of living in an organized society - reading notices, directions, maps, government circulars, etc.; the category of language forms valued by the individual, as assumed here, allows for the inclusion of voluntary reading (like expository prose, or popular magazine articles, sports articles, travelling documents etc. (Elley, 1995)

Academic Achievement

How should academic achievement be understood as part of the model in Figure 3. What subject areas are included in the model as constituents of academic achievement? Are there any cognitive abilities that are associated with academic achievement?

Academic achievement is defined in the present study as a measure of cognitive abilities and knowledge: verbal and general reasoning abilities as revealed by performance in English, Geography, Home Science, Kiswahili, Mathematics, Music, and Science. It is, however, noted that academic achievement can mean more than the description given by embracing such areas as creativity, critical thinking, and deep understanding that are not well captured by

objective tests as found in the KCPE. It was within the context of the subjects offered at KCPE that two abilities, verbal and general reasoning, were included instead of other abilities like (spatial, visual, etc.) (see Carroll, 1993). The verbal component seems to cut across a number of subjects at the KCPE (English, Home Science, Geography, and Kiswahili). All these subjects, according to KCPE of 1993, (see Appendix C), appear to be verbally loaded. However, the languages (English and Kiswahili), where understanding and use of words and their meanings in sentences, is a basic requirement, stand out as more verbal. The rest of the subjects at KCPE (Geography, Home Science, Mathematics, Music, and Science) share another ability, general reasoning. Here, the demand seems to involve, at least at this educational level in Kenya, such qualities as being able to compare, judge, decide, calculate, and the gaining, retaining, retrieving of factual information.

The main reason for the inclusion of academic achievement in the theoretical model for the study, is its key role in determining the future of students in Kenya. Therefore, any attempt to unravel possible indicators that can help in understanding or improving performance on subjects at the KCPE level may be a good breakthrough educationally.

Reading literacy and academic achievement

How then is reading literacy and academic achievement related according to the model in Figure 3? Reading literacy is a generalized skill which is also context dependent (Lundberg & Rosén, 1995). Hence, in schooling, reading literacy is a vital tool in pursuing academic achievement. For instance, a poor reader is at stake in understanding and performing academic tasks. So, a deeper understanding of the relationship that exists between reading literacy and academic achievement is deemed as very crucial to success and survival in a society where heavy weight is laid on academic achievement.

The Relevance of the Study

The age group of the 14 year old students is of a major significance in the Kenyan system of education because these are the students who form the foundation of secondary education. Thus, the interest that led to considering this group for the present study, in the sense that the group forms a stratum of future leaders, policy developers, educators, doctors, and other professionals etc. once they successfully complete their education. The cohort is 27 percent of the national enrolment who are successful to reach the secondary school level of education. It is also the age when a big transition occurs in the Kenyan educational system. An individual is expected to join the next step in the academic ladder, the ninth grade/some professional training/or to be self-reliant. Consequently, academic achievement at this level plays a vital role in determining a student's personal life and his/her participation in the building of the nation.

The present study seeks to identify the level of impact of such underlying components as general reading ability and documentary aspects that are crucially embedded in reading literacy, and how these components individually or collectively relate to each subject at the KCPE. Hence, what care should be taken by parents, teachers, and students to cater for home and school conditions, students' voluntary reading, and reading opportunities factors that could latently affect a student's academic achievement.

Hypotheses

The following hypotheses have guided the study considering the theoretical and educational implications of the study already discussed (see The Conceptual Framework for the Study pp. 38-40):

1. there is a structural relationship between verbal ability, general reasoning ability and each subject opted for at the KCPE, namely: English, Geography, Home Science, Kiswahili, Maths, Music and Science.

2. there is a rather high correlation between reading literacy and subjects in which verbal ability form a major component, namely: English and Kiswahili.

3. Home Science and Geography will probably have moderate correlation with reading literacy since they are assumed to be less verbally loaded than the languages.

4. Mathematics, Music, and Science are expected to have relatively low correlation with reading literacy because they primarily demand more of general reasoning ability as opposed to reading literacy. But an influence of the documentary component of reading literacy that deals with charts tables maps and figures may probably indicate substantial correlations.

The range of the correlations in the present study will be based on the following:

.01 - .19 - very weak correlation
.20 - .39 - slight correlation
.40 - .59 - moderate correlation
.60 - .79 - high correlation
.80 - 1.00 - very high correlation (Best, 1981).

In addition, it also hypothesized that there is an effect in performance on reading literacy by the following factors:

i. Home and school conditions
ii. Reading opportunities
iii. Socio-economic level of families
iv. Student's voluntary reading, as measured by the Student Questionnaire of the IEA- Reading Test (Modified Version).

5. It is also hypothesized that there is gender difference in performance on reading literacy and academic achievement. Based on the earlier studies, it is expected that girls outperform boys on a reading literacy test.

Basic Assumptions

There are two closely related basic assumptions to this study:

1. Reading literacy is a more stable trait that is not dependent on the short time difference between the students' participation in academic achievement examination and the taking of the reading literacy test and reading literacy questionnaire five months later.

2. Both sources of data, namely: scores on reading literacy and the KCPE results are treated as the actual representations of the students' performance on reading literacy and academic achievement respectively.

Limitations

Among the limitations in this study, the following can be mentioned:

1. The generalization on the findings of this study will be limited to the ninth grade students only.
2. Academic achievement, in a wider sense, includes more than the subjects tested at the KCPE. As a concept such subtle aspects as creativity, critical thinking, and deep understanding are not easily captured by such objective tests as found at the KCPE.
3. Reading ability consists of more than just the text-types and reading domains used here in the study. Further, reading ability may be better assessed by a wide range of authentic reading situations which would give a comprehensively deeper picture of one's reading ability.
4. The background resources are only approximately measured by the items included in the Student Questionnaire of this research.
5. There is a tendency of students to inflate their responses to the questionnaire in a way they deem more desirable than the actual settings in question.

Definition of Terms

For the purpose of clarity, the following terms have been defined to give their meanings as used in this study:

Reading Literacy (RL): It is not only the totality of being able to decompose texts and identify, locate, search words in written form but also the ability to interpret symbols, signs, posters, tables etc. in a functional manner (Lundberg, 1991; Elley, 1992; Wagner, 1992).

Academic Achievement (AA): a measure of cognitive abilities and knowledge: verbal or general reasoning ability as revealed by the performance in English, Kiswahili, Geography, Music, Home Science, Science and Mathematics respectively at the KCPE.

Performance: The quantitative measure of what a student earns in a given test or examination.

The IEA- Reading Literacy Test: This is a test on reading literacy as constructed by a team of researchers on behalf of The International Association for the Evaluation of Educational Achievement (IEA) in 1990.

Kenya Certificate of Primary Education (KCPE): It is an examination at the end of 8 years of primary education in the Kenyan educational system. The examination is centrally managed and run by the Kenya National Examination Council (KNEC).

Judgmental Sample: In this kind of sample, it is the researcher who determines the group for the study that has a reasonable variation to represent the general population because the other forms of sampling traditionally used are not feasible.

General Reading Ability (GRA): refers to the expository passages that are continuous texts designed to describe, explain, or convey factual information or opinion to the reader (Elley, 1992). According to this research, the following will be expository passages: Marmot, Paracutin, Promise of Laser, Smoke, and Woman Learns To Read. (see Appendix A).

Documentary component (Docu): refers to structured information displays presented in the form of tables, maps, graphs, lists or sets of instructions (Elley, 1992). In this study, the following passages are treated as documentary: Bus, Travellers Card, Directions, Global Weather, Resources, Job Vacancies, and The soluble Aspirol with Vitamin C. (see Appendix A).

Construct: is used here to refer to a measure of something that is not directly observable but is literally designed by the researcher to summarize or account for the regularity or relationships that are found in the tests, achievement, or questionnaire (Lundberg, 1992).

Chapter Four

Methodology

This study involved the obtaining of descriptive information about the target population and analyses of structural relationships between constructs.

The Target Population

The target population comprised of all the ninth grade students in the Kenyan secondary schools totalling to 256,163. This cohort was chosen for the study for the following reasons:

1. This is the age group that corresponds to the IEA-Reading Literacy Test-Population B, 1990.

2. The age group is quite significant in the educational system in Kenya since it is when transition occurs in one's academic career. Based on one's performance at KCPE, he/she can either join the next step, that is, the ninth grade to continue with academic pursuance/go in for a professional training like in the village polytechnics/or become self-reliant citizen as put philosophically so well in the Kenyan system of education.

The Sample

The selected sample consisted of 1098 students 14 years of age who did KCPE a year prior to joining their ninth grade in the Kenyan secondary schools.

Out of the eight provinces in Kenya, four were selected, namely: Nairobi Area, Rift Valley, Western and Nyanza. There was no realistic probability sample for all the schools in Kenya in this study. Instead, the sample to be drawn had to be a judgmental sample where sufficient variation was to be expected to capture the structural relationships. The main requirement here was a reasonable degree of variation because the structural patterns obtained in this research could be cross validated by a comparison of a random selection of the half of the tested sample. The sample,

being judgmental, the entire sample size of 1098 students was used for the study. That is, averagely 275 students from each of the four provinces, involving 12 schools, from both urban and rural areas. A school was considered to be in an urban area if it met the following conditions:

1. it was within an urban centre with at least 2000 inhabitants.
2. it was within a ten kilometre radius of a city or a town.
3. the management of the school included some members of the city, municipal, town or urban council.

A school which did not meet these two conditions was considered as rural.

There were seven rural and five urban schools having 687 and 411 students, respectively. All the schools had a total of 27 classes of which there was a 100 percent response rate from the 1098 students to both reading literacy test and the questionnaire (see Table 1).

Table 1. Presentation of the students by province, school, sex, classes and location:

Province	School	Sex	No. Classes	Urban/Rural	No. of Students
Nyanza	Kisumu	G	2	Urban	69
	Kisumu	B	2	Urban	81
	Chula-Imbo	B	2	Rural	77
	Sinyolo	G	2	Rural	50
	Maseno	B	3	Rural	135
Western					
	Mbale	B	3	Rural	136
	Keveye	G	3	Rural	114
Rift-Valley					
	Sosiot	G	2	Rural	75
	Chepte-nye	B	2	Rural	100
	Kericho	B	2	Urban	81
Nairobi					
	Lenana	B	2	Urban	90
	Precious Blood	G	2	Urban	90
TOTAL					
4	12		27	Urban=5	1098
B=Boys and G=Girls				Rural=7	

The Procedure

The researcher sought for permission from the Office of the President of the Republic of Kenya to conduct this study, after which he used the letter of permission from the President's Office to request the respective Provincial Education Offices to avail to him a list of all secondary schools in each. Based on this list, a judgmental sampling procedure was used to get the schools for the study. Permission was also asked from the headmasters for giving the Reading Literacy Test and the Student's Questionnaire to the relevant students. Meanwhile, KCPE results of the same students was sought for from the headmasters of the relevant schools. The researcher went to the selected schools twice. On the first visit, a permission to conduct the research among the ninth grade students and scheduling of the appropriate timings for the research was arranged. The second visit entailed the actual administration of the reading test and the questionnaire. The reading literacy test was administered first. There was a time limit of one and a half hours. There was a break for 15 minutes then the questionnaire was administered. It had a time limit of one hour.

Instrumentation

The IEA Reading Literacy Test

The data for this research was collected by the use of a reduced version of the Reading Literacy Test of the IEA - Population B, (1990). The modification was due to the fact that some questions in the original were deemed as culturally biased. The principle of selection was to maintain as much as possible multiple choice questions and not open ended questions which could be problematic in marking. The narrative component of the reading literacy test was omitted purposely because it captures more or less the same aspect as the expository component (Lundberg et al., 1992) which was included instead. Lastly, due to time element, administration, number of students involved in the study and the financial obligation it was necessary to keep the minimum but sufficient number of questions for the research. (see Appendix A).

The original version of reading literacy test of the IEA 1990 population B consisted of 89 questions. These questions comprised three domains (narrative, expository, and documentary) each having 29, 26, and 34 questions respectively (see Elley, 1992). In the present study only two domains (expository and documentary) were used. Out of 60 original questions, only 52 carefully worded questions were used. Eight questions were left out because they were identified as either having a complicated format or being culturally biased.

The test comprised of 12 passages or texts. To each passage, three to seven questions were attached making a total of 52 questions. The generally multiple choice questions were characterized as literal, inferential and integrative. It was the student's responsibility to search for the answers from the passages on the basis of those kind of questions. For instance, some documentary questions demanded locating, identifying or integrating information from different sources. Others, as those demanding general reading ability, required more text processing like comprehension. The sequence of the passages were as follows:

1. *Fill in the Traveller's Card (CARD).* It was a documentary piece of information It comprised of information about a female on a trip. The students were required to understand the information given about her and to be able to fill out the traveller's card on her behalf. There were seven items to be filled out. For example, one of the tasks was to fill out a passport number.

PASSPORT
NO._____

2. *Resources (RESO).* It was a documentary map showing resources in different regions. It was the students task to locate the resources found in particular regions. There were three open ended questions with single worded answers for this task. This was an example of such questions:

What resource is mined south-west of Columbia? _____

3. *Marmot (MARM).* It was an expository passage tha consisted of about 200 words about marmots. It was the task of the students to read this passage and understand it. They were then to answer four multiple choice inferential questions from the passage For example:

Why had the marmots to live so long in one place?

A. They did not like to travel
B. They could not climb down the cliffs
C. They came there long ago
D. It was a very good place

4. *Job Vacancies (JOB).* It was a documentary of job advertisements. The four job vacancies which were advertised were: stock delivery, a telephonist, a clerk, and a waitress. Each job vacancy had a job description of what an aspirant should expect The students were supposed to understand the job descriptions and be able to answer three multiple choice questions. For instance, there was such a question:

Which job advertisements would interest you if you wanted a job...
...where you will work with large amounts of money?

A. Stock Delivery
B. Telephonist
C. Clerk
D. Waitress

5. *Promise of Laser (LASE).* It was an expository passage of about 300 words on laser. The content was typically that of comprehension. It was the student's duty to derive the answer from the passage after reading and understanding the passage and then answering six multiple choice questions based on the passage. An example taken from the passage is given below and a question type:

"... The first laser was built in 1960 by Theodore Maiman. It contained a special man-made ruby rode, with a flash tube coiled around it."

Question: "What was the central component of the first laser?

A. Ruby rod
B. Gas rod
C. Liquid
D. Light rod

6. *A Woman Learns to Read (WOMA).* It was an expository passage that consisted of about 200 words that showed the benefits of literacy to a woman in Tanzania. The students were expected to read and understand, then answer four multiple choice questions. The following was a sample of an inferential question the students were to answer:

Question: Which of these sentences best express the underlying theme of this passage?

A. The benefits of becoming literate.

B. The way in which one person became literate.

C The problems of being an illiterate Tanzanian farmer.

D. The difficulties of coping in a literate world.

7. *Paracutin (PARA).* It was an expository information about the formation and eruption of volcanoes and how such eruptions affect man and the environment. The students were expected to read and understand the passage by integrating information and answering six multiple choice questions. The following was one of the questions:

Question: What was destroyed in the eruption?

A. Only a village

B. The villagers living close by

C. The forests and fields around Paracutin

D. Two peasants

8. *Bus (BUS).* It was a documentary that comprised of a part of a bus timetable. It was the task of the students to be able to understand the timings when the bus arrives or leaves a particular station. The students had three open ended one answer questions to answer on the bus timetable. The following was an example of the questions:

Question: When does the first bus from Weston to the city leave the Monument each day?_____

9. *Directions (DIRE).* It was a documentary information that consisted of sequential information based on given directions. The students had to follow these directions and in turn answer three open ended questions based on the given directions. For instance, if

a student had followed the directions properly, he/she should be able to answer a question like this:
What is the difference between the numbers in the bottom two sections? _____

10. *Global Weather (GLOB).* It was a documentary chart that gave information on the low and high temperatures (Celsius) and the weather conditions for certain cities around the world. It was the students' task to use that information to answer four open ended questions like:
What was the low temperature in Beijing? _____

11. *Soluble Aspirol with Vitamin C (VITA).* It was a documentary reading. It consisted of a notice given on medicine called Soluble Aspirol Vitamin C. The notice included: when to use the medicine, how the dosage should be taken, the directions on how to dissolve the medicine in water, and warnings against possible dangers. The students were required to answer three multiple questions based on the given notice. The following was a literal question that demanded a student should give an answer directly from the passage:
Question: In one day, an adult should take no more than...

A. three tablets
B. four tablets
C. six tablets
D. eight tablets

12. *Smoke (SMOK).* It was an expository passage. It comprised of about 350 words on the dangers of smoking cigarette on human health. The students had the task of answering six multiple questions based on the passage. An example of an inferential question the students were to answer is given below:
Question: The destruction of DNA caused by smoke is dangerous because...

A. it leads to the deposit of tar-like substances in the lungs.
B. it causes cancer of the blood.
C. it may bring about error in the construction of DNA.
D. it prevents DNA from reconstructing.

Student Questionnaire

The IEA student questionnaire (1990) was used but with some modifications as was deemed necessary. It had 86 questions. The questions were having alternative responses on rating scales from 1-2, 1-4, 1-5, 1-6, and 1-7. The questions were grouped into four factors according to the IEA 1990 Questionnaire, namely:

a. *Home and school conditions*

This section consisted of a variety of questions ranging from those that relate to the student like the language used while at home, time spent watching TV, the number of meals a student gets per day, education of parents, and amount of time spent in doing school homework. The questions here were 17 and it was the task for the student to chose from up to seven possibilities which particular alternative fitted best their condition. (see Appendix B).

b. *Reading Opportunities*

This part of the questionnaire dealt specifically with the reading opportunities a student has. If there were books at home, community or school library, how often did the student get access to the reading materials? There were 12 questions related to reading opportunities and it was the students task to choose the best alternative out of the 5-6 given. (See Appendix B)

c. *Socio-economic status*

This section had 19 questions pertaining to the socio-economic status of the student which captured information based on possessions in the home as well as personal ones. Nineteen items were listed and the student was to write 1 if they did not have the item or 2 if they had one or more of that particular item. The items varied across countries in the IEA 1990 study, the ones in the present study were selected as indicators of socio-economic status based on the Kenyan setting by the researcher. The items were as follows: Electricity, TV, Home Library, Study Table, Safari Lamp and so on. (see Appendix B).

d. *Student's voluntary reading*

This part consisted of 30 questions that dealt with the frequency with which a student reads various reading materials. Thus, books, magazines, newspapers or simply the topics of interest to the student like Romance/Fashion, Wildlife/Nature in magazines or sections of newspapers like Comics Strips, Classified Advertisements etc. The choices ranged from almost never to almost everyday rated from 1-6. (see Appendix B).

The Kenya Certificate of Primary Education

In this study, academic achievement was measured by performance on the Kenya Certificate of Primary Education (KCPE). Out of the thirteen subjects offered at KCPE, the seven chosen were those that most students opt for. These included English, Geography, Home Science, Kiswahili, Mathematics, Music, and Science. Those subjects where some students could opt for alternatives like religious education/Hindu/Islam or French/German were not included in the study for obvious reasons of lack of commonalty among students on the subjects offered at KCPE. The following subtests of the battery are used in this study:

a. *English*

The question paper consisted of 50 multiple choice questions. The kind of texts were varied. They included filling in the blanks, re-arranging words to make sentences or meaningful paragraphs, synonyms, and comprehension passages.

The answers were lettered A, B, C, D. In each case only one of the four was correct. It was the student's task to choose the correct one. For example: When re-arranged, the words below make a sentence. Which word becomes forth in the sentence?

YOU ME TO PEN GIVE A PROMISE.

A. TO
B. GIVE
C. A
D. PEN

b. *Geography*

This section had 30 multiple choice questions. The sections comprised of a map requiring identification, location, and knowledge based on the given map. There was also weather related questions and regional and physical geography of East Africa. A sample of such questions was as follows:

In Kenya the lake region receives higher rainfall than the Nyika plateau because

A. the lake region is at a higher altitude
B. the lake region is nearer to the equator
C. the lake region is nearer to a large body of water
D. the lake region is experiencing stronger winds

c. *Home Science*

There were 30 multiple choice questions in this section. The range of questions covered such areas as health and hygiene and some First Aid Tips.

A sample question was as given below:

Potatoes in a meal

A. protect the body against diseases
B. provide the body with energy
C. form strong bones in the body
D. repair body tissues

d. *Kiswahili.*

Like English, it had 50 multiple choice questions which cut across levels such as filling in the blanks based on a passage, two comprehension passages, antonyms, idiomatic expressions, sentence analysis etc. For instance, this was such a question:

Siku ya Mei mosi huadhiminisha siku kuu ya:

(The first of May is observed as a holiday for:)

A. Wapigania uhuru *(freedom fighters)*
B. Wafanyakazi *(workers)*
C. Wafanyabiashara *(businessmen)*
D. wapigania haki. *(human rights activists)*

e. *Mathematics*

There were 50 multiple choice questions in this section. The questions here varied from basic arithmetic like solving of fractions to calculations of equations, ratios, profits and loss, interpretation of graphs, basic geometry and trigonometry. The following was a sample question:

After Khadija spent 25% of her money, she remained with sh 150. How much money did she have to start with?

A. sh 112.50
B. sh 187.50
C. sh 600.00
D. sh 200.00

f. *Music*

This part included 30 multiple choice questions in areas such as naming of notes, identifying time signatures, keys, instruments, and scales, grouping of notes, translation of solfa melodies, and general knowledge in music. This was an example of a literal question which requires identification:

Which of the following instruments is shaken to produce sound?

A. Kayamba.
B. Wadindi
C. Mulele
D. Mukanda

g. *Science*

This section dealt with the natural sciences such as biology, chemistry and physics. There were 30 objective questions, namely matching and multiple choices on facts or knowledge on different areas as naming the parts of a flower, the buoyancy and pulley system principle, classification of animals, vertebrates etc. This type of question was a typical example of a matching question:

Which one of the following animals is CORRECTLY MATCHED with its adaptation?

	ANIMAL	ADAPTATION
A.	Hawk	Long beak.
B.	Frog	Scales.
C.	Praying	Colour.
D.	Ant-bear	Teeth.

Interviews

It was deemed desirable during this study to conduct interviews so as to capture some aspects of reading literacy that could not easily be tapped otherwise. An attempt was also made to create an interpretational framework in order to come a bit closer to the cultural dimension of reading literacy in Kenya. Two schools were selected for the interviews, namely: Kisumu Girls High School and Maseno Boys High School. The criteria for selecting these schools was that the students there could express themselves freely in their mother tongue, that is, the researcher's mother tongue as well, and an easy access to the schools. The total number of students who participated in the interview was six, three from each respective school.

During the interview, the researcher recorded the answers to the questions he posed to the students in vernacular using a tape recorder. The questions varied in purpose. There were those that were aimed at knowing the students' perspective of the benefits of reading literacy, the availability of such resources that enhance reading literacy as TV, radio, and newspapers. It was also intended that through the interview such areas like attitude, self concept and values attached to reading literacy by the society would be tapped. (see Interviews in chapter Five).

Chapter Five

Presentation of Data and Analysis of Findings

This chapter deals with the presentation of data and analyses of the findings for reading literacy, voluntary reading, and background factors on reading literacy as indicated by the questionnaire. Academic achievement will be analysed on the basis of performance on the subjects opted for at KCPE. The first part will be on descriptive statistics followed by reliability, correlational examination, and possible differences at gender and locational levels. A Lisrel (Linear Structural Equations) approach will then be applied on measurement and structural models for reading literacy and academic achievement according to the conceptual framework in this study. Finally a scrutiny of the interviews conducted among students in the study will be done.

Reading Literacy

The first obvious component of reading is that the printed words are recognized and give access to the reader's mental lexicon. The second general component is comprehension. In fact, it is not a single component at all but a set of interrelated processes by which the reader builds a representation of the text meaning (Lundberg & Rosén, 1995).

In contrast to the view of reading as a situation specific activity, it is assumed that there is some communality in most reading situations which may be called "general reading ability" which basically involves word recognition and comprehension.

However, it is also recognized that the operation also involves text specific ability factors. For example, Bruner (1986), argued that narrative comprehension might involve a different type of thinking from what is involved in informative and argumentative comprehension. These two modes of cognitive functioning may provide distinctive ways of ordering experience and constructing reality (Lundberg & Rosén, 1995).

Specific texts, for example, a brief document like a table or temperature diagram, involve passage specific demand characteristics: including specific prior knowledge, specific inference requirements or specific spatial design conventions. Thus, there is a reasonable basis for taking passage-specific factors into account in decomposing of reading ability. (see Table 2).

Table 2. Maximum scores, Means, Standard Deviations, and average proportions of correct responses (p-values) of passages for reading literacy test.

Domain	Passage	Maximum	Mean	SD	p-Value
	BUS	3.00	1.77	1.01	60
	CARD	7.00	4.70	1.30	67
	DIRE	3.00	1.80	1.31	60
Documentary	GLOB	4.00	2.34	1.35	58
	JOB	3.00	2.03	.76	73
	RESO	3.00	2.13	.81	70
	VITA	3.00	2.22	.84	73
TOTAL (DOCU)		26	16.99	4.27	66
	LASE	6.00	4.18	1.35	70
GRA	MARM	4.00	2.72	.93	68
(Expository)	PARA	6.00	3.15	1.50	52
	SMOK	6.00	2.54	1.55	42
	WOMA	4.00	3.20	.92	80
TOTAL (Exp.)		26	15.79	4.16	62
RL	12	52	32.76	7.64	64

Table 2 shows performance at passage level for reading literacy in general. The performance on the documentary domain was higher than that of the general reading ability with p-values of 66 and 62 percents respectively. It was also noted that the passage entitled

Smoke had the lowest p value of 42 percent. This could be because it was the last passage on the reading literacy test and fatigue or slow speed may have been contributing factors to such low performance. The average p-value indicates that 64 percent of the 52 items were answered correctly. (see Table 3).

Table 3. Reliability Coefficients (Cronbach's Alpha) for Reading Literacy (RL) Test, its components, Questionnaire and Academic Achievement.

Item	No. of Items	N=1098	N=700(B)	N=398(
RL Test	52	.84	.82	.87
Documentary	26	.76	.74	.79
Expository	26	.73	.71	.77
RL Questionnaire	83	.89	.90	.88
AA	270	.87	.84	.90

In Table 3, reliability coefficients are presented for both the reading literacy test and questionnaire. Cronbach's Alpha is the type of reliability used in this study. It is based on correlations between single items. It is therefore a measure that reflects the internal consistency of the test (Norusis, 1990). The reliability of both reading literacy tests and reading literacy questionnaire were .84 and .89 respectively. However, the latter may not be accounted for by eliminating entirely the possibility of compliance effect. It was also noted that when the individual components of reading literacy were looked upon there was a reduction on the level of reliability which can be explained by the number of items being reduced to half. It was also noted that girls indicated higher reliability than boys showing their adherence to instruction.

Correlation among the passages of reading literacy

The correlational matrix of reading of the passages, in Table 4, indicates that there were substantial variations in the inter-correlations among the passages as was expected since each

passage at least was supposed to be different from the other. It was noted that the range of variation was from .14 between BUS and JOB to .36 between GLOB and DIRE. (see Table 4).

Table 4. Correlational matrix of reading literacy passages

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1 BUS	1.00											
2. CARD	.21	1.00										
3. DIRE	.29	.32	1.00									
4. GLOB	.23	.27	.36	1.00								
5. JOB	.14	.23	.19	.20	1.00							
6. LASE	.26	.23	.27	.29	.26	1.00						
7. MARM	.20	.25	.23	.20	.20	.26	1.00					
8. PARA	.23	.31	.28	.31	.22	.31	.31	1.00				
9. RESO	.24	.18	.20	.23	.20	.22	.23	.23	1.00			
10. SMOK	.26	.22	.33	.34	.25	.32	.29	.35	.24	1.00		
11. VITA	.27	.21	.29	.34	.19	.24	.17	.26	.18	.36	1.00	
12. WOMA	.18	.21	.25	.21	.19	.24	.24	.32	.15	.22	.20	1.00

Testing a Measurement Model of Reading Literacy

It was deemed necessary in this study that a less ambiguous decomposition of reading literacy be obtained from the reading test. The decomposition was expected to involve three levels: general reading ability, some domain of reading ability like document, and passage factors. Such decomposition required an analysis on item level because the number of items was too big for Lisrel programme, so there had to be a parcelling of items. The items were then parcelled randomly into twos to fit Lisrel programme (see Jöreskog & Sörbom, 1993). Then, there were at least two indicators for each passage. The response to a given item was then not just a function of general reading ability and documentary domains but also a function of passage factors according to this hypothesized description.

The result of the parcelling led to a correlational matrix which was then used as an input and run by Lisrel.

It is necessary at this point to give reasons for the use of Lisrel as a statistical tool in the present study. It is also appropriate to define and explain terminologies that are commonly used in a Lisrel program.

Lisrel helps in situations where theoretical models based on some hypotheses are desired (Jöreskog & Sörbom, 1993), it is fitting to use it here. The are two main reasons for the use of Lisrel analyses in this research, namely:

1. it is a good procedure to test how well the theoretical model in the present study fits the data, either in part or as a whole.

2. it is also useful in dealing with aspects of measurement models which describe how well the latent variables are measured by the observed variables.

There are also advantages in the use of Lisrel in that:

1. it is a measurement model for establishing the latent structures of the variables which are postulated in the hypotheses in the study.

2. it decomposes the variances in the manifest variables which helps in characterizing the models.

In as much as Lisrel does not prove causality, it helps in the rejection or acceptance of the theoretical hypotheses in a study.

The statistical procedure used here was to compute a correlational matrix and then run the matrix on Lisrel to get fit statistics, standardized weight loadings, and the estimated error variances, and paths of the observed variables from the latent variables in the hypotheses of each part of reading literacy and academic achievement part of the model in Figure 3. It was noted that the confirmatory factor analysis of Lisrel was the relevant type of analysis of Lisrel for the present study in the sense that there was a theoretical model to be tested in the study (see Figure 3. on The Theoretical Framework of the Study). Though at times, exploratory factor analysis was used to test for some potential possibilities within the theoretical model.

The following measures of fit statistics were used with regard to Lisrel:

1. In Lisrel, chi-square is regarded as a measure of overall fit of a model to the data for a study. It measures the distance (difference, discrepancy, deviance) between the sample covariance (correlation) matrix and the fitted covariance (correlation) matrix. It is usually used in testing a model against an alternative. For instance, chi-square is a badness-of-fit measure in the sense that a small chi-square corresponds to good fit and a large chi-square to a bad fit (see Browne, 1984).

2. Root Mean Square Error of Approximation (RMSEA) is a measure of discrepancy per degree of freedom. Browne & Cudeck (1993) suggest that a value of 0.05 of error indicates a close fit and that values upto 0.08 represent reasonable errors of approximation in the population. A 90 percent confidence interval of error and a test of error < 0.05 give quite useful information for assessing the degree of approximation in the population.

3. The goodness of fit index (GFI) is a measure of how well a model fits a given data. The values should be between zero and 1 theoretically but the closer it is to 1 the better the fit (Jöreskog & Sörbom, 1993).

4. Adjusted goodness of fit index (AGFI) is an adjusted measure of how well the model fits the data, adjusted for degrees of freedom (see Jöreskog &. Sörbom, 1989).

These four measures of fit statistics were used as the criteria for determining whether the theoretical model in the present study held or not, either in part or as whole. It is necessary to note that out of the hierarchical models discussed in Chapter One, it is the Nesting Factor (NF) model approach will be used in determining whether every observed variable is related to more than one latent variable.

Measurement models for reading literacy

Reading literacy models were based on the presumed hypotheses of the theoretical model in Figure 3 in this study. The first attempt was to find a common factor. Once such a general or common factor was nested, another factor of documentary kind would remain. Furthermore, the item parcels were also assumed to be dependent

on a passage factor. However, such a factor, called passage, could not be found in the present study. Too much of common variance was absorbed by the general factor and the document factor.
A model was tested using the confirmatory factor analysis technique of Lisrel, had a chi-square of 475 with 200 degrees of freedom and an RMSEA of 0.035. Although an RMSEA value is satisfactorily low, the GFI and an AGFI values were far from the ideal. Hence following the suggestions for modification by the Lisrel programme, namely the addition of the error covariance of certain variables for a better fit, led to the selection of an alternate version of the model.
The selected measurement model of reading literacy here should be seen in the light that attempts made to find a factor that cuts across all parcelled items was fruitless because fit statistics could not be computed by the Lisrel programme, hence no path diagram. However, the notion in the theoretical model that there is a general reading ability was supported when a confirmatory factor analysis was done. There was also an aspect of reading literacy, namely, documents, that deals with the location, identification and association of information in brief documents. The latter successes were realizable because of the confirmatory factor analysis that was used based on the theoretical model (see Figure 3). It should also be noted, at this stage, that there was need to add error covariance among the variables as was suggested by the Lisrel programme due to the fact that the tests and questionnaire in the present study were given at the same time, using the same format, and to the same students leading to error covariance in the estimation of performances (see Jöreskog & Sörbom, 1993).

The goodness of fit statistics based on the selected model, in Figure 4 for the data under study, showed a chi-square of 240 with 169 degrees of freedom, an RMSEA of 0.020, GFI of 0.98 and an AGFI of 0.97. All these values indicated that this model fit the data for the study. Hence it was the selected model for reading literacy. However, it was noted that a correlation between the latent variables was .91. This could be because both variables were derived from the same test at parcelled item level, having the same format, done at the same time, and by the same students of a restricted range. Despite these communalities that led to an inflated

correlation of latent variables, it was still apparent that there exists two underlying components of reading literacy in the reading literacy test.

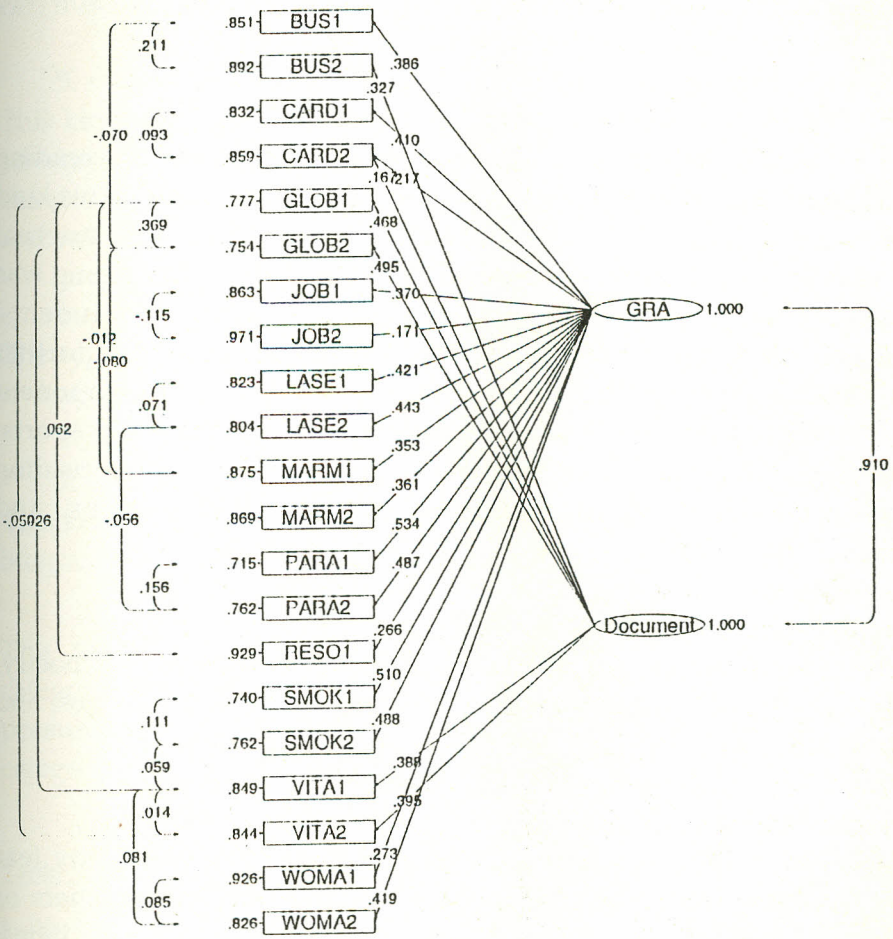

Figure 4. The selected measurement model for reading literacy

General reading ability in the present study covers almost all the items except for Global Weather and Vitamin C Aspirol which are clearly document factors. It also shares those items like Job Vacancies and Bus Timetable which are certainly documentary. Only one item parcel (Card) is shared by both latent variables.

This is certainly consistent with the general hypothesis with the cited two exceptions that obviously there is no general ability which covers over and above a document factor. That is, the document factor can not be considered just as a residual factor and there is no specific passage factor identified.

Students' voluntary reading

In the questionnaire, there were questions in relation to the reading interests and habits referred to here as voluntary reading. This kind of reading is done purely on voluntary basis without an external authority to monitor its execution. Students' voluntary reading was measured by the questionnaire under the subtitle of students' reading interest and leisure. The voluntary reading was further subdivided into seven types based on a principal component analysis, namely: romance, entertainment, superficial, sports, travel, news and politics, and classic reading. The types of reading were based on topical reading from books, magazines, and newspapers as follows:

1. *romance*

This type of reading included such topical items as romance, poetry, music, and fashion as they were read from books, magazines, and newspapers.

2. *entertainment*

These were basically oriented for entertainment without any fear for a test or examination from those in authority like teachers or parents. The kind of reading here consisted of the following items: mystery/spy, adventure, science fiction, and humour.

3. *superficial reading*

This type of reading does not require mental efforts but rather short items read mainly for fun or information. Here the items read were mainly based on movies/TV, comic strips, and classified advertisements.

4. *sports*

This type of reading had such topical readings related to sporting activities. The following were the way the items were grouped in the questionnaire for the study: sports/recreation/health, and car/motorcycle.

5. *travel*

This kind of reading comprised mainly of such areas as reading an adventure story on travelling to see nature. In the questionnaire for the study they were grouped under the following headings: travel, and wildlife and nature.

6. *news/politics*

The type of reading here included such areas as: history/politics, and news/politics.

7. *classic*

This kind of reading included such items as: classical literature and biography/autobiography.

The total number of items was initially 30 but after the categorization into types of reading, only 25 items remained. It was presumed that there was a factor that cut across all the seven categories, namely: general reading activity. (see Table 5).

Table 5. Students' voluntary reading activities item wise

a. Books

Variable	Mean	SD	Implication
Mystery/Spy	3.1	1.6	One or two times a month
Romance	2.3	1.5	Less than once a month
Sports/Recreation/Health	4.1	1.5	About once a week
Adventure	3.8	1.5	About once a week
Science Fiction	3.9	1.5	About once a week

Horror	2.5	1.5	One or two times a m
Poetry	3.4	1.5	One or two times a m
History/Politics	4.2	1.5	About once a week
Humour	2.6	1.7	One or two times a m
Science/Technology	4.0	1.5	About once a week
Travel	2.9	1.4	One or two times a m
Wildlife and Nature	3.1	1.5	One or two times a m
Music	3.5	1.8	About once a week
Classical Literature	3.6	1.6	About once a week
Biography/Autobiography	3.6	1.6	About once a week

b. Magazines

Variable	Mean	SD	Implication
Sports/Recreation/Health	4.2	1.6	About once a week
Movies/TV	3.7	1.8	About once a week
Romance/Fashion	2.8	1.8	One or two times a mo
News/Politics	4.4	1.7	About once a week
Music	3.7	1.8	About once a week
Wildlife and Nature	3.3	1.6	One or two times a mo
Computers/Technology	2.7	1.7	One or two times a mo
Car/Motorcycle	2.8	1.8	One or two times a mo

c. Newspaper reading

Variable	Mean	SD	Implication
Sports/Recreation/Health	4.2	1.7	About once a week
Comic Strips	3.2	1.9	One or two times a mo
Movies/TV	3.8	1.8	About once a week

News/Politics	4.3	1.7	About once a week
Romance/Fashion	2.9	1.8	One or two times a month
Classified Advertisements	4.0	1.7	About once a week
Business/Finance	3.6	1.7	About once a week

Table 5 shows the descriptive statistics by items which comprise voluntary reading in the present study.

Based on the above mentioned conceptual framework of thought, attempts were made by an exploratory factor analysis technique using Lisrel programme to see if a model of such a nature, with all paths coming from a general reading activity factor to the 25 items would fit the data in the study. The attempt was fruitless.

However, a model which worked only after a number of suggested modifications by Lisrel, had a chi-square of 2035 with 254 degrees of freedom, an RMSEA of 0.08, GFI of 0.85, and an AGFI of 0.81 indicating that the fit was not good enough. Further trials were made based on the suggested modifications by Lisrel and a much better fit was found. (see Figure 5).

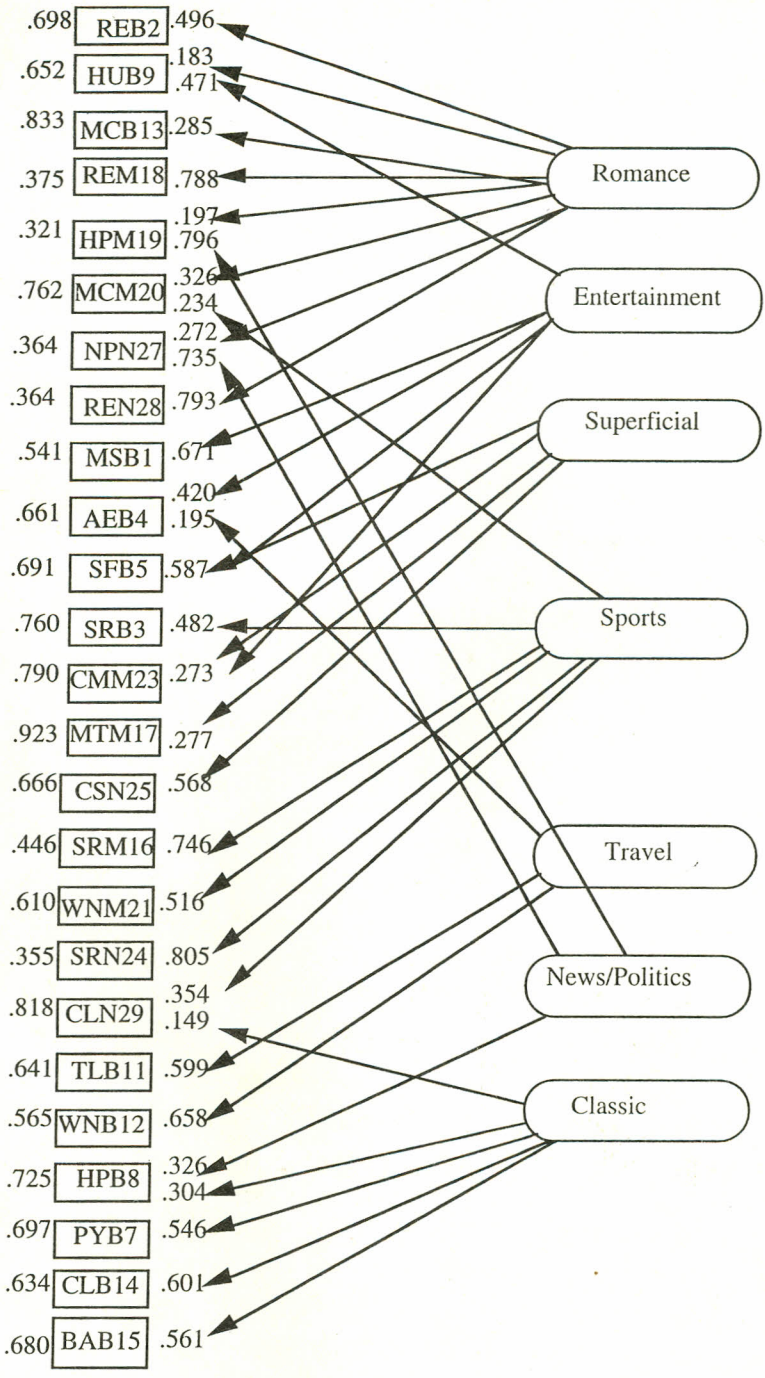

Figure 5. The selected measurement model for types of voluntary reading.

The abbreviations of the variables, for example, REB2 is for the second item in Table 5 RE-Romance B-Books; HPM19 is for item 19 HP-History/Politics M-Magazines etc.

The selected measurement model in Figure 5 had a chi-square of 226 with 160 degrees of freedom, an RMSEA of 0.020, a GFI of 0.98, and an AGFI of 0.98 which was statistically acceptable. (see Table 6 for correlational matrix for the latent variables.

Table 6. Correlation matrix of the latent variables for students' voluntary reading

	Romance	Entert	Superf	Sport	Travel	Newsp	Classic
Romance	1.00						
Entert	.57	1.00					
Superf	.48	.37	1.00				
Sport	.70	.44	.30	1.00			
Travel	.45	.63	.21	.46	1.00		
Newsp	.67	.38	.25	.57	.34	1.00	
Classic	.46	.42	.06	.56	.45	.55	
	1.00						

Table 6 shows the inter-correlation among the latent variables, in Figure 5. There was variation as expected from .06 between classic and superficial readings and .70 between sport and romance due to the fact that each type of voluntary reading had been determined by a factor analysis into different types of reading .

In contrast to the other models in the present study, this particular model dealt with attitudes of the students, and their reading interest and habits. It was found to be more susceptible to compliance effect than the other models in which actual measures were based on actual performances.

Table. 7. Correlation matrix for each passage of reading literacy and voluntary r
activity types

Variable	Romance	Entert	Superf	Sport	Travel	Newsp	C
RL	.23	.23	.38	.05	.17	.11	-.
BUS	.07	.08	.17	-.01	-.02	.05	-.
CARD	.22	.16	.29	.04	.10	.10	-.
DIRE	.08	.12	.21	-.01	.02	.06	-.
GLOB	.14	.13	.26	.04	.02	.05	-.
JOB	.10	.13	.17	.03	.09	.05	-.
RESO	.13	.13	.15	.07	.06	.09	-.
VITA	.12	.12	.17	.03	.04	.09	.0
LASE	.17	.17	.21	.08	.05	.10	-.
MARM	.13	.12	.19	.04	.05	.06	-.
PARA	.14	.16	.28	.03	.03	.05	-.
SMOK	.14	.10	.26	-.03	.01	.04	-.
WOMA	.10	.11	.15	.08	.06	.02	-.

According to the results in Table 7, all types of voluntary reading had low positive correlations with the average performance on reading literacy test in this study. It is worth noting however that there was variation in the degree of relationships from -.11 with classics to .38 with superficial reading. Apparently, there is less compliance in superficial reading not particularly of socio-economic value but it is rather a more accurate estimate of what a student does. As depicted in Table 7, reading more superficial reading correlates better with reading literacy. Concerning classic reading, it seems that students inflated their reading on classic but in reality do not read as much.

Given that a correlation of .07 was significant at .05 level, each passage correlated well with types of voluntary reading activities. The was a variation, however, from -.12 between SMOK and Classic to .29 between CARD and Superf.

Background factors

There are a number of background factors that were considered important from the reading literacy questionnaire. The following were the factors:

1. Home literacy
2. Student activities
3. Home possessions
4. Self concept on reading and education

Table 8. The Means and Standard Deviations of background factors item wise as measured by a questionnaire and their implications

1. Home Literacy

Variable	Mean	SD	Implication
Speaks English	2.5	.75	Sometimes
Guardian's education	12.6	3.7	12 years of education
Daily newspaper at home	1.6	.54	Get daily newspaper
Number of books at home	4.1	1.5	Have 50-100 books
Questions about homework	2.9	1.0	Most of the time

2. Student Activities

a. Home activities

Variable	Mean	SD	Implication
Responsibility	1.9	3.4	Before and after school

Watch TV or Video	2.7	1.8	1-2 hrs. watching

b. Library

Variable	Mean	SD	Implication
Borrow books	3.8	1.1	Once a week

3. Home and personal possessions

a. Home possessions

Item	% of entire sample	SD
Electricity	75	.50
TV	75	.50
Tape recorder	85	.47
Study table	95	.32
Safari lamp	75	.50
Bicycle	75	.50
Home library	75	.50
Water-tap	85	.47
Bible/Koran	95	.23
Clock	85	.45

b. Personal possessions

Item	% of sample	SD
Bedroom	80	.48
Study table	90	.41
Books to read	95	.26

Tape recorder	70	.49
Bicycle	68	.48
Watch	85	.40
Shoes	95	.15
Torch	80	.49

4. Self concept on reading and education

Variable	Mean	SD	Implication
Good at reading	2.7	.76	Good
Education years anticipated	5	1.0	7-8 years

Table 8 presents descriptive statistical information on each background factor at the item level.

1. *Home literacy*

Home literacy here referred to a number of activities that go on in the home that have some connections to the literacy of a student. The following were such activities:

a. How often a student speaks English at home.

On a five point rating scale, the mean response was 2.5 which implies that the students speak English "sometimes", that is, apart from the other languages they find themselves automatically using like their mother tongue or Kiswahili.

b. Guardian's education

In response to the question about the education of their guardians responsible for their education had received in terms of years spent in school, the mean was 12 years of education. It is reasonable to note that the range was from those parents without any formal education at all and those who were highly learned, some having PhDs. Although there was an apparent compliance effect, the

students seemed to show that their guardians have quite substantial level of education which may enhance a good literacy environment.

c. Daily newspaper at home

This was with reference to how often the students get the local dailies at home. On a 1 and 2 scale as to whether they get a newspaper or not, a mean of 1.6 was the response result. This indicated that about 80 percent of students received local dailies.

d. Number of books at home

The response to the question on books had a mean of 4.1 on a scale of 1-6, implying that the students had 51-100 books in their homes.

e. Questions about homework

Students indicated that parents or guardians ask them about homework by a mean response of 2.9 on scale of 1-6 as, "most of the time".

2. *Students' activities*

Students' activities included the activities that a student may be involved in while at home (home activities) or those activities related to using a library (library use).

a. Home activities

Students were asked as to whether they were given some responsibility before and after school. The results show a mean of 1.9 on a scale of 1 and 2 of either a "yes" or a "no" indicating that most students have such responsibilities. TV and Video watching were also grouped under this category. Based on a scale of 1-7, a mean time of 2.7 watching TV or Video which implied 1-2 hours of watching daily.

b. Library use

In response to a question on how often the students borrowed books from a library, a mean response of 3.8 on a scale of 1-7 which indicated that the students borrow books at least once a week.

3. *Home possessions*

When the students were asked about what they possess in their homes in a wide range of items for instance, having access to: electricity, TV, tape recorder, study table, safari lamp, bicycle, home library, water tap, Bible/Koran, and a clock. The students' response could be a 1 if they did not possess the item and a 2 if they possessed the item respectively. On the average, each item was claimed to be possessed by 75 percent of the students.

4. *Self concept on reading*

When asked how good they were at reading, the students rated themselves as "good" on a scale of 1-4, having a mean response of 2.7. Meanwhile on how many years of anticipated education the mean response was 5, on a 1-7 scale implying at least 7-8 years of education yet to be achieved and that would give them at least a university education.

Background factors and performance on reading literacy

Table 9. The relationship between reading literacy and background factors

Variable	Homelit	Homepos	Studact	Selfcon
RL	.20	.12	.17	.27

According to Table 9, the results indicate that there existed significant relationships between RL and background factors. The background indicators that seem to be lightly taken in the Kenyan setting are apparently important for the general acquisition or maintenance of reading literacy. So, probably the common saying "send a pupil to school and let the teachers make him/her learn" as many a parent seem to think in Kenya, needs to be discarded. The desire, therefore, should be to create an environment that is as healthy as possible in fostering students' reading literacy, at the least, by catering for these mentioned background factors if reading literacy, among the students at this age, is to improve. This is

explained further by a multiple of correlation of .34 which is 11 percent of the variance being accounted for by the four background factors.

Self concept here under background factors is something that a student develops. It is based on a students' judgement on worthiness that he/she holds towards himself/herself. (see Taube, 1988).

The students' rating on their reading as being good and their anticipated education as being about that of university level was quite remarkable. This shows that the Kenyan students, at this level of their education, have positive attitudes about themselves and towards their education and that this attitude has a significant relation (.27) to their reading performance.

Academic Achievement

Table 10. Maximum scores, Mean performances and Standard Deviations of academic Achievement for subjects at KCPE

Variable	Maximum	Mean	SD	p-Value
ENGL	12.00	9.11	2.60	81
GEOG	12.00	9.09	2.28	76
HSCI	12.00	9.06	2.17	76
KISW	12.00	8.31	2.21	69
MATH	12.00	9.18	2.57	77
MUSI	12.00	9.08	2.16	76
SCIE	12.00	9.02	2.20	75
AA	84.00	62.85	11.75	76

Concerning academic achievement, as shown on Table 10, there were higher levels of performance realised because the students

under the study were mainly those who had very high grades at KCPE and managed to secure places in secondary schools, which was only 27 percent of this cohort . Hence an average p value of about 76 percent was obtained. The high p-value of 81 percent in English may be explained by the fact that students in Kenya use English as the medium of instruction in all other subjects except for Kiswahili, thus, their proficiency. The low p-value of 69 percent was noted in Kiswahili. This may be due to the fact that those students whose mother tongue is of Nilotic origin which has no resemblance to Kiswahili appeared not to perform as well in comparison to those of Bantu origin. The former group was about 40 percent of the student population under the study.

Measurement Models of academic Achievement

It was hypothesized that there are two latent factors that seemed to stand out in relation to the subjects at the KCPE. These two factors were suggested to be the two underlying mental abilities that have an effect on performance on subjects at the KCPE. According to the conceptual framework model for the study those underlying factors were presumed to be verbal and general reasoning abilities. Carroll (1993) in his view of what can be referred to as a general reasoning ability, is considered to be at or near the core of what is traditionally meant by intelligence. This general reasoning ability was assumed to be one of the underlying factors behind some of the subjects opted for at KCPE and when this factor had been nested, what remained in this case, another factor, referred to as verbal was also obtained. This meant that those subtests which required less of text processing but more of a general reasoning ability as in Geography, Home Science, Mathematics, and Science were in one category and the others that demanded a particular level of text processing, like English and Kiswahili, were in the other. However, it must be pointed out that such a factor that could cut across all the subjects at the KCPE was not realizable. (see the measurement model for academic achievement in Figure 6).

Table 11. Correlational matrix for Academic Achievement subjects wise

Variable	1.	2.	3.	4.	5.	6.	7
1. ENGL	1.00						
2. GEOG	0.57	1.00					
3. HSCI	0.60	0.63	1.00				
4. KISW	0.59	0.43	0.46	1.000			
5. MATH	0.54	0.63	0.59	0.36	1.00		
6. MUSI	0.53	0.61	0.60	0.36	0.63	1.00	
7. SCIE	0.54	0.66	0.65	0.39	0.69	0.66	1.00

The correlational matrix in Table 11 shows that apart from Kiswahili which had coefficient of correlations ranging from .36 to .59 with the rest of the subjects, all had coefficients of correlation above .50. This may be explained by the fact that all of the subjects at KCPE were given in English except for Kiswahili together with the fact that all tests had essentially the same format of multiple choice answers, were given at the same time, under identical conditions, and similar requirements. Due to restriction of range, one can suspect that the observed correlations underestimate the relationships.

A number of models were tried for academic achievement and the latent factors that were presumed to influence them were based on the conceptual framework for the study in Figure 3.

First, an attempt was made by having paths from general reasoning ability go to all the subjects at KCPE including the languages. The problem encountered with this approach was that a general reasoning ability could not be identified by Lisrel hence a number of important steps could not be computed, namely the residualised modification indices, and there was no path diagram eminent.

When paths related to general reasoning ability were sought, another factor was evident, which in this case was referred to as a verbal ability. When this attempt was made there were some degrees of success although not satisfactory.

The fit information was as follows:

1. CHI-SQUARE = 65 WITH 11 DEGREES OF FREEDOM
2. RMSEA = 0.067
3. GFI = 0.98
4. AGFI = 0.96

Due to quite a high RMSEA of .067 the fit was deemed as not fully acceptable despite the good values of GFI and AGFI.

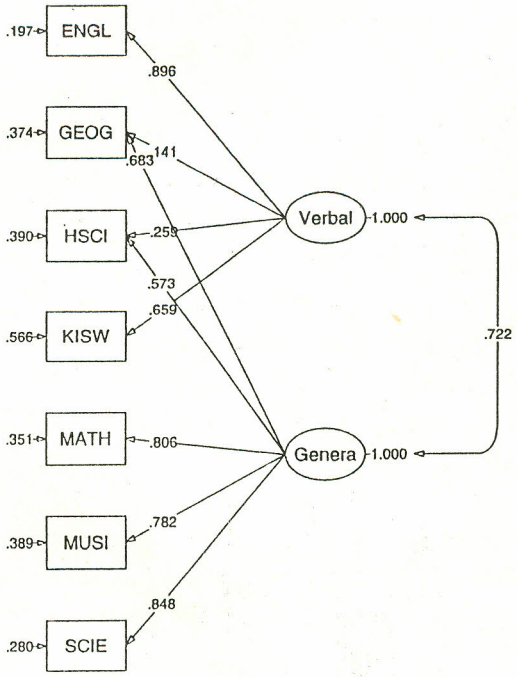

Figure 6. The selected measurement model for academic achievement.

The discussions that follow is with the framework of thought that the model in figure 6, was the selected model. When the suggestions on modifications made by Lisrel were adhered to, an improvement on the structure was eminent. There were considerable changes on the fit statistics and the paths. (see Figure 6). A chi-square of 19 with

11 degrees of freedom, an RMSEA 0.027, a GFI of .99, and an AGFI of .98 showed a good fit of the data of the study. Also, the standardized weights on subjects with high verbal loadings seem to corroborate with subjects at KCPE that were indicated as having higher loadings from general reasoning abilities, thus, there appears to be a match between the working model and that in figure 3. The Lisrel output in this case corroborated with the theoretical hypothesis that there are at least two underlying factors that are crucially important for performance at KCPE, namely: general reasoning ability and verbal ability. It was apparent that general reasoning ability is required mainly for Geography, Home Science, Math, Music, and Science because these areas need previous factual knowledge on specifics unlike verbal that deals with decoding of texts and also the search and location, and association of connected texts.

Voluntary reading and academic achievement

Table 12. The relationship between voluntary reading and academic achievem

Variable	ENGL	GEOG	HSCI	KISW	MATH	MUSI	SCIE
Romance	.21	.13	.13	.14	.13	.15	.11
Entert	.22	.16	.14	.13	.16	.15	.17
Superf	.20	.14	.13	.09	.18	.13	.15
Sport	-.01	-.02	-.02	-.02	.01	-.01	.01
Travel	.07	.04	.04	.04	.08	.05	.07
Newsp	.07	.06	.03	.05	.07	.06	.06
Classic	-.01	-.03	-.02	-.01	.02	.01	-.03

The results in Table 12 above indicate that voluntary reading had significant relationship with academic achievement. All types of voluntary reading had positive coefficient correlations with performance on each subject at the KCPE except for voluntary reading in sports and classics.

Table 13. The relationship between academic achievement and background factors

Variable	Homelit	Homepos	Studact	Selfcon
AA	.13	.08	.13	.33

Home literacy had a significantly positive correlation with academic achievement. This may mean that a good literacy environment has a positive impact on students' performance on the academic achievement. Although students seemed to inflate their access to possessions to appear as coming from quite affluent homes, the results may still be good indicators of the relationship between home possessions and academic achievement. The correlation between home possessions and academic achievement was significantly positive. Finally, self concept seemed to have had significantly positive correlation with academic achievement. Thus, it appeared that being good at reading, good socio-economic status in terms of possessions and having high academic goals have substantial relationship with performance on KCPE. The multiple correlation of .35 accounting for 12 percent of the variance by the background factors.

Gender Differences

The observations made in the introductory chapters with reference to gender differences in reading literacy left a lot to be desired. Especially, when Hyde and Linn (1988) concluded that the observed differences between gender in verbal ability (which in their case was found to favour girls in 75 percent of the studies cited), were so small that the differences were potentially of little educational significance. In a study of this nature, it is generally assumed that there is to some degree an element of gender difference. Furthermore, in a country where there seem to be some bias in educational activities favouring boys one may expect gender differences. It was for these reasons that a comparison on gender level was eminent.

Gender difference in reading literacy

There seems to be an element of gender differences favouring girls in reading literacy when specific tasks in reading are examined (Gates, 1961). However, Hogrebe et al. (1985) concluded that, overall, gender accounts for less than one percent in explaining reading outcomes. They found out that an absence of gender differences was not distributed on a similar fashion across the ability continuum. Hogrebe and colleagues also state that "although females performed above, and boys below the nation at each age on the reading comprehension exercises, ... suggest that some of the difference in performance may be attributed to the amount of time boys and girls spend reading in their spare time. At all ages, females tend to read more than males in their spare time" (NAEP, 1982, p.13). In this study an examination of reading literacy among girls will be dealt with first then followed by that among boys.

There appeared to be no overall difference in performance among girls and boys on the reading literacy test. The mean performances were 32.77 and 32.76 for girls and boys respectively. However, there were some differences at the passage level. (see Table 14). Girls seemed to outperform boys on CARD, VITA and WOMA. It is interesting to note that two of the three passages have female characters. This may explain why girls had higher mean performances on them. Also, an apparent feminine quality of following strictly any given instructions may be why they did better on VITA. Otherwise on the rest of the passages, the mean performances are about the same. (see Tables 14 and 15).

Girls:

Table 14. Maximum scores, Means, SD, and average proportions of correct responses (p-values) for passages of RL (Girls).

Domain	Passage	Maximum	Mean	SD	p-value
	BUS	3.00	1.62	1.05	54
	CARD	7.00	4.92	1.34	82
	DIRE	3.00	1.72	1.31	57
DOCU	GLOB	4.00	2.39	1.10	60
	JOB	3.00	2.02	.78	67
	RESO	3.00	2.04	.85	68
	VITA	3.00	2.30	.80	77
TOTAL (DOCU)		26	17.01	4.54	66
	LASE	6.00	4.14	1.45	69
	MARM	4.00	2.66	.99	67
GRA	PARA	6.00	2.97	1.57	50
	SMOK	6.00	2.71	1.62	45
	WOMA	4.00	3.28	.82	82
TOTAL (GRA)		26	15.76	4.48	63
	12	52	32.77	8.23	65

Reading literacy measurement model for girls

As in the case of reading literacy for the entire sample, there was a general reading ability that cut across most of the items and a factor capturing the documentary domain. There appeared to be the same trend in terms of paths and insignificantly small variations in the standardized weight loadings on the variables. However, a higher relationship was noted between general reading ability and

documentary domain, in terms of correlation coefficient, as being .93 (see Figure 7).

With reference to the fit, first, the model elicited a chi-square of 468 with 207 degrees of freedom, an RMSEA of .056, a GFI of .90 and an AGFI of .88. These results were towards the lower side. However, when suggestions for modification by Lisrel were adhered to, the fit improved to a chi- square of 237 with 188 degrees of freedom, an RMSEA of .026, a GFI of .95 and an AGFI of .93. This fit was deemed acceptable for the data under study.

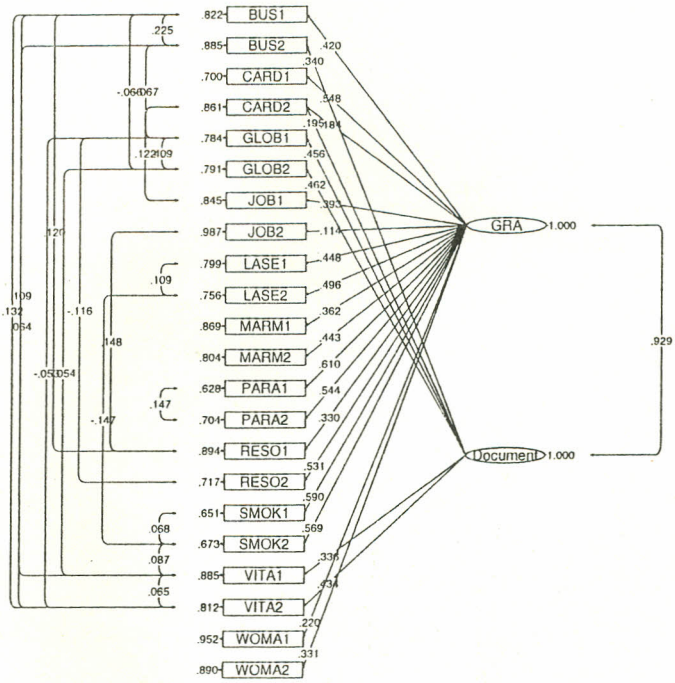

Figure 7. The selected measurement model of reading literacy among girls

Boys:

Table 15. Maximum scores, Means, SD, and average proportions of correct responses (p-values) of passages for RL (Boys).

Domain	Passage	Maximum	Mean	SD	p-value
	BUS	3.00	1.85	.95	62
	CARD	7.00	4.56	1.26	65
	DIRE	3.00	1.83	1.30	61
DOCU	GLOB	4.00	2.31	1.13	58
	JOB	3.00	2.03	.75	68
	RESO	3.00	2.19	.78	73
	VITA	3.00	2.18	.86	73
TOTAL (DOCU)		26	16.95	4.11	66
	LASE	6.00	4.21	1.30	70
	MARM	4.00	2.75	.90	69
GRA	PARA	6.00	3.25	1.45	54
	SMOK	6.00	2.44	1.51	41
	WOMA	4.00	3.15	.97	79
TOTAL (GRA)		26	15.80	3.97	63
	12	52	32.76	7.30	65

As stated earlier, there was no difference in the mean performances between boys and girls on reading literacy test. Passage wise, there seemed to be a slightly higher mean in favour of boys on DIRE. The explanation would be that the passage required mathematical skills, an area where boys appear to outperform girls in general. (see Tables 14 and 15).

Reading literacy measurement model for boys

Again as was anticipated, a general factor was found to have more paths to most of the items and a document factor having fewer paths to the items respectively. Here also there seemed to be significant variation in the standardized weight loadings as in the case for girls. A significantly high correlation of .89 was noted between the latent variables, namely, general reading ability and document (see Figure 8).

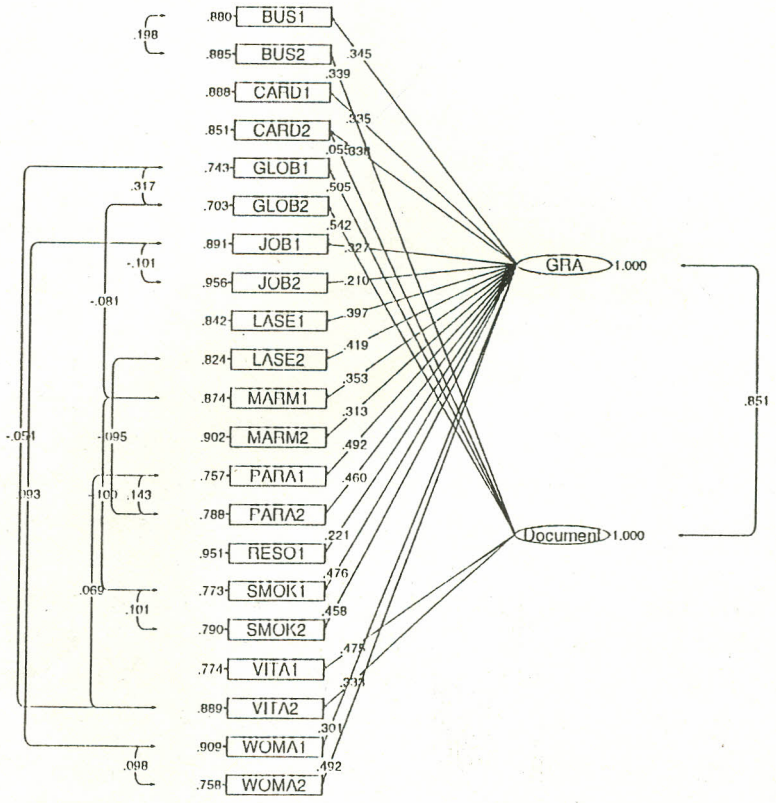

Figure 8. The selected measurement model of reading literacy among boys.

Concerning fit statistics, the model had a chi-square of 414 with 187 degrees of freedom, an RMSEA of .042, a GFI of .95, and an AGFI of .93 before modifications suggested by Lisrel. However, there was

room for improving it based on the suggestions for modification by Lisrel. The improved fit had the following values: a chi square of 218 with 175 degrees of freedom, an RMSEA of .019, a GFI of .97, and an AGFI of .96. The latter fit, being much better than the first, was the one selected as the working model.

Voluntary reading and performance on reading literacy gender wise

Table 16. The relationship between voluntary reading activity types and reading literacy components gender wise

Variable	Romance	Entert	Superf	Sport	Travel	Newsp	Classic
Gender	G (B)	G (B)	G (B)	G (B)	G (B)	G (B)	G (B)
Docu	.27 (.17)	.13 (.26)	.42 (.30)	-.08 (.11)	-.07 (.16)	.03 (.18)	-.23 (.02)
GRA	.26 (.18)	.15 (.23)	.46 (.26)	-.02 (.09)	-.08 (.16)	-.02 (.15)	-.24 (-.04)

When the relationship between voluntary reading activities and each component of reading literacy was examined, it was interesting to note that there was no significant correlation between voluntary reading activity and reading literacy among girls. However, the relationship was significant among boys.

At the level of types of voluntary reading, girls had higher correlations than boys in romance, superficial reading with respect to the documentary domain while boys had higher correlations in entertainment and travel. At the GRA domain, the same trend was apparent where girls had higher correlations in romance and superficial reading while boys had higher correlations in entertainment, travel, and news and politics. However, the relationships between reading literacy components and each type of voluntary reading indicates that girls were also having the negative correlations in sport, travel, newsp, and classic. (see Table 16).

Table 17. The relationship between each passage of reading literacy and t voluntary reading activities gender wise

Variable	Romance	Entert	Superf	Sport	Travel	Newsp	Classic
Gender	G (B)	G (B)	G (B)	G (B)	G (B)	G (B)	G (B)
BUS	.18 (.02)	.05 (.09)	.24 (.13)	-.07 (.02)	-.07 (.01)	-.04 (.09)	-.04 (-.04
CARD	.24 (.19)	.10 (.22)	.39 (.22)	-.03 (.09)	-.02 (.19)	.06 (.15)	-.16 (.03)
DIRE	.13 (.06)	.07 (.15)	.23 (.20)	-.06 (.01)	-.07 (.07)	.01 (.08)	-.14 (.01)
GLOB	.17 (.12)	.14 (.13)	.30 (.24)	-.06 (.09)	-.06 (.07)	-.01 (.09)	-.11 (.02)
JOB	.14 (.08)	.10 (.15)	.25 (.12)	-.01 (.05)	-.00 (.14)	.03 (.07)	-.12 (-.03
RESO	.20 (.10)	.07 (.16)	.22 (.11)	-.02 (.12)	-.03 (.11)	.02 (.13)	-.15 (.04)
VITA	.10 (.12)	.03 (.17)	.19 (.14)	-.08 (.09)	-.05 (.08)	.05 (.13)	-.09 (.07)
LASE	.20 (.16)	.09 (.19)	.31 (.15)	.00 (.11)	-.05 (.12)	-.00 (.16)	-.15 (.04)
MARM	.22 (.08)	.09 (.13)	.32 (.12)	.04 (.04)	-.04 (.12)	.04 (.08)	-.14 (-.03
PARA	.21 (.11)	.15 (.15)	.38 (.22)	-.02 (.06)	-.08 (.11)	-.03 (.09)	-.20 (-.03
SMOK	.18 (.10)	.08 (.14)	.34 (.20)	-.07 (-.00)	-.08 (.07)	-.04 (.09)	-.22 (-.07
WOMA	.05 (.12)	.08 (.14)	.18 (.13)	-.01 (.12)	-.01 (.10)	-.03 (.05)	-.10 (-.02

When the relationship between types of voluntary reading and each passage of reading literacy was looked into gender wise, it was noted that girls had significantly higher correlations than boys on each passage with romance and superficial reading. On the other hand, boys had significantly higher correlations than girls in almost every passage with entertainment, sport, travel, and news and politics. These relationships on passages seem to indicate favourably for girls in reading romantic (romance, poetry, music and fashion) and superficial (movie-, comic-strips, and classified advertisements) literature. On the other hand, boys had higher correlations on entertainment (mystery/spy, adventure, science fictions, and humour), travel (adventure stories, travelling to see

nature or game), sports (recreation/health, car/motorcycle), and news and politics (history, politics, and news). (see Table 17).

Background factors and reading literacy gender wise

Table 18. The relationship between reading literacy and background factors gender wise

Variable	Homelit	Homepos	Studact	Selfcon
Gender	G (B)	G (B)	G (B)	G (B)
RL	.25 (.18)	.13 (.12)	.18 (.17)	.46 (.14)

According to Table 18, both girls and boys show significant relationships between background factors and reading literacy. However, there were higher levels of correlation among girls on almost each variable of the background factors than those of boys. Girls seem to be influenced more by the background factors. A possible explanation is that culturally girls are encouraged not to go out to such public places as town libraries out of school hours instead they are considered to be safe from social evils if they stay at home. Having considerably higher self concept of themselves and about their future education, they appear to make the best use of the facilities within their home environment.

Gender difference and academic achievement

Girls:

There appeared to be a difference between the mean performance for girls in comparison to boys. While the former had a mean of 60.26, the latter had 64.32. At each subject level, it seemed to be consistent that the mean for those subjects linked to general reasoning ability (Geography, Home Science, Math, Music, and Science) was lower among girls. However, there was no difference in the mean performance between the subjects associated with verbal ability (English and Kiswahili). (see Tables 19 and 20).

Table 19. The Maximum scores, Means, SD, and p-values of the subjects a (Girls).

Ability	Subject	Maximum	Mean	SD	p-valu
Genera	GEOG	12.00	8.31	2.39	69
	HSCI	12.00	8.81	2.23	73
	MATH	12.00	8.55	2.72	71
	MUSI	12.00	8.87	2.19	74
	SCIE	12.00	8.20	2.35	68
TOTAL (Genera)		60	42.74	10.00	71
Verbal	ENGL	12.00	9.13	2.16	76
	KISW	12.00	8.20	2.11	70
TOTAL (Verbal)		24	17.53	3.80	73
AA		84	60.26	12.75	72

Academic achievement measurement model for girls

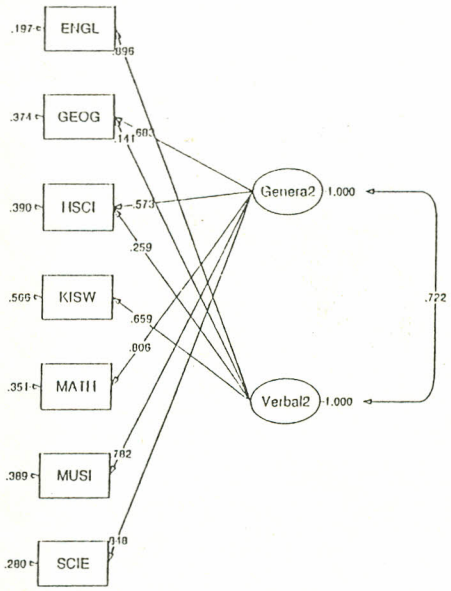

Figure 9. The selected measurement model of academic achievement among girls.

As in the previous cases, standardized weights for the selected model had a pattern that in principle holds to the theoretical model in Figure 3 that: there are two underlying factors that influence performance on the subjects at KCPE significantly. Though variations on specific weights were noted. The pattern of the selected model for girls remained the same as that of the entire sample but it had different fit statistics as follows: a chi-square of 19 with 11 degrees of freedom, an RMSEA was 0.027, a GFI 0.99 and an AGFI of 0.98. Like that of the entire sample, the model for girls fit the data for the study. (see Figure 9).

Boys:

Table 20. The Maximum scores, Means, SD, and average p-values of the subjects at KCPE (Boys)

Ability	Subject	Maximum	Mean	SD	p-value
	GEOG	12.00	9.53	2.08	79
	HSCI	12.00	9.20	2.12	77
Genera	MATH	12.00	9.53	2.40	79
	MUSI	12.00	9.20	2.14	77
	SCIE	12.00	9.49	1.97	79
TOTAL		60	46.97	8.38	78
Verbal	ENGL	12.00	9.10	2.16	76
	KISW	12.00	8.26	2.27	69
TOTAL		24	17.36	3.87	72
AA	7	84	64.32	10.88	75

Boys appeared to have higher mean performance for the subjects at KCPE than the girls. (see Table 20). This difference may be explained by the advantages generally given to boys over girls, in the Kenyan setting, particularly when a choice is to be made between a boy or a girl in such activities as education.

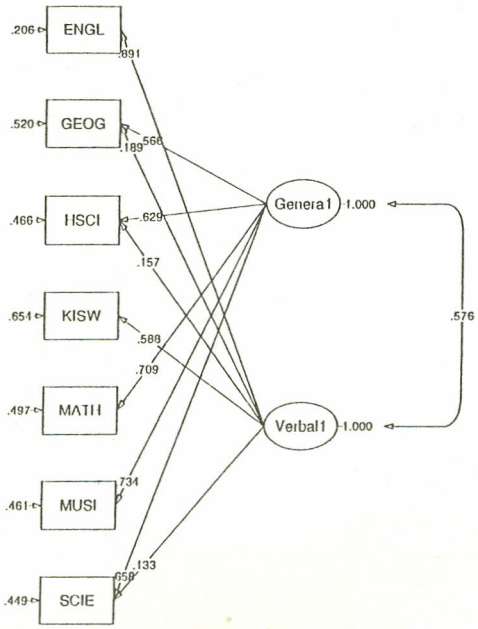

Figure 10. The selected measurement model of academic achievement among boys.

The difference among the models for boys, the entire sample, and girls was not in their patterns but rather their degrees of fit. It was however noted that the standardized weights varied although the variation was small. (see Figure 10). The fit statistics were, namely: a chi-square of 29 with 10 degrees of freedom, an RMSEA of 0.042, a GFI of 0.99, and an AGFI of 0.98. The fit statistics here indicated that the model fitted the data for the study. Hence the selected model for boys' performance on the subjects at KCPE.

Table 21. The relationship between academic achievement and background factors gender wise

Variable	Homelit	Homepos	Studact	Selfcon
Gender	G (B)	G (B)	G (B)	G (B)
AA	.25 (.14)	.13 (.05)	.16 (.16)	.47 (.21)

As in the case for reading literacy, there were higher correlations in favour of girls between background factors and academic achievement. It is also believed here that the reasons cited earlier for the marked difference in correlations for library use is the same as for reading literacy. (see Table 21).

Reading Literacy and Academic Achievement Examined

One of the purposes of this study was to examine the relationship between reading literacy and academic achievement (see Figure 11).

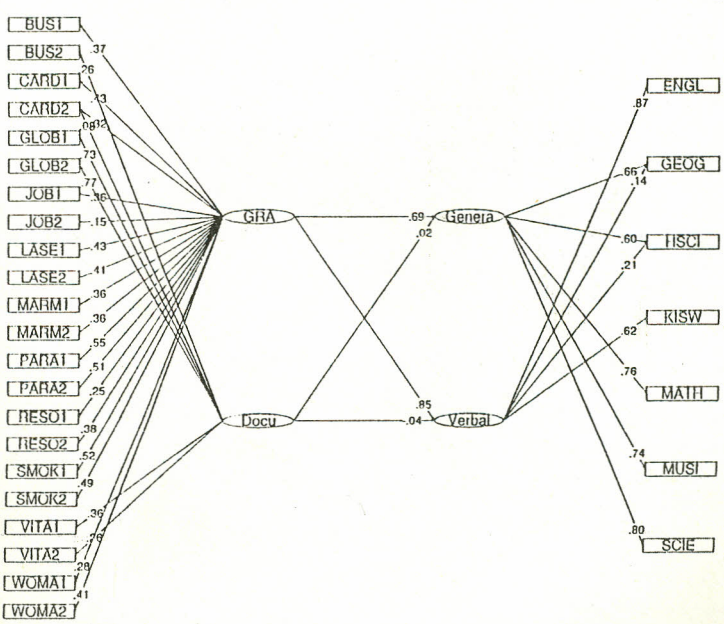

Figure 11. The path-analytic model: Reading literacy and academic achievement combined.

Figure 11 indicates the main model for the present study. It is a combination of the two separate measurement models for reading literacy and academic achievement (see Figures 4 and 6). General reading ability had a correlation with verbal ability of .85 which was higher than .69 between general reading and general reasoning ability as was expected because both general reading ability of reading literacy and the verbal component of academic achievement have text loaded items in the test formats in this study (see Appendices A and C).

Concerning fit statistics in Figure 12, the following measures were deemed as acceptable: a chi-square of 963 with 369 degrees of freedom, an RMSEA of 0.038, a GFI of .94 and a GFI of .93, were consistent with the theoretical framework that there exists a structural relationship between reading literacy and academic achievement as postulated in the framework (see Figure 3 under: The Conceptual Framework for the Study pp. 38-40).

Table 22. The correlation matrix of Eta and Ksi of the model that combines reading literacy and academic achievement models

	Genera	Verbal	GRA	Docu
Genera	1.00			
Verbal	.58	1.00		
GRA	.70	.83	1.00	
Docu	.45	.48	.62	1.00

The relationships between the documentary aspect of reading literacy and academic achievement show very low correlations. It was apparent according to the correlation matrix of Eta and Ksi (see Table 22) that the documentary component had higher correlation with verbal ability (.48) as compared to the documentary component of reading literacy and general reasoning ability of academic achievement (.45).

Given that the model is correct, it appears that training a student in general reading ability may have a good impact on the performance in subjects that are verbally loaded and in general reasoning subjects at KCPE (see Figure 11). This causal interpretation should be understood in the light that the present study dealt heavily with relationships based on correlational approach.

Table 23. The Coefficient Correlations between Reading Literacy and performance on each subject at KCPE

Subject	ENGL	GEOG	HSCI	KISW	MATH	MUSI	SCIE	A A
RL/AA	.61	.51	.52	.44	.46	.47	.47	.66

As shown in Table 23, when a manifest summary score of reading literacy was related to a summary score of academic achievement, there was a substantial relationship of r = .66 inclusive of estimated errors which suggested that the subjects at the KCPE level seemed to be verbally loaded. However, there was a reduction by 4 percent of the correlation when the background factors were removed from both reading literacy and academic achievement by a path analysis technique to r = .62. (see Figure 12).

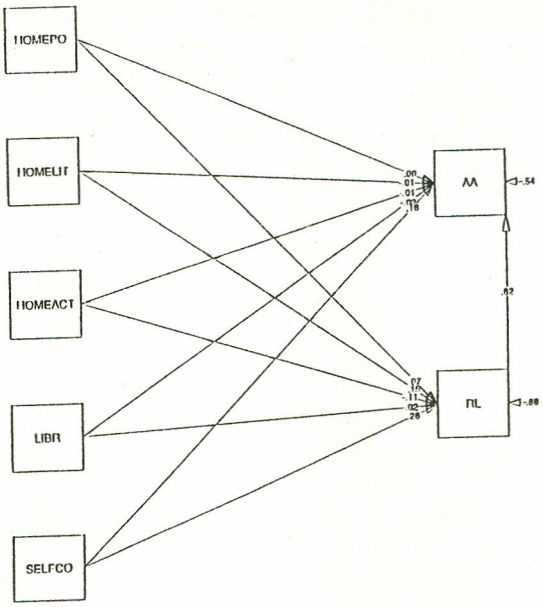

Figure 12. The path-analytic model: Relationship between reading literacy and academic achievement with background factors extracted.

Though, as already pointed out an error free estimate correlation is much higher. (see Figure 11). The results in Figure 12 was very significant in the present study in that they show that even after the removal of the influences of background factors there remains still a high correlation between reading literacy and academic achievement. The results here also show that background factors have some impact on both reading literacy and academic achievement hence they should be catered for in order to have students experience their optimal performances in both reading literacy and academic achievement.

Table 24. The relationships between each component of reading literacy and each subject at the KCPE gender wise

SUBJECT	ENGL	GEOG	HSCI	KISW	MATH	MUSI	SCIE
GENDER	G (B)	G (B)	G (B)	G (B)	G (B)	G (B)	G(B)
RL/AA	.68 (.57)	.59 (.48)	.60 (.48)	.59 (.36)	.59 (.39)	.55 (.41)	.54 (.45

Table 24 demonstrates that at gender level, reading literacy was a prominent indicator for all subjects but performance in English stood out for both boys and girls with an r of .57 and .68 respectively. It was also a good indicator of performance in Kiswahili for girls, r = .59 unlike boys, r = .36 in this study. It was worth noting that the girls had consistently higher correlations between reading literacy and each subject at KCPE. However, the variances in performance among girls on reading literacy and academic achievement were also higher.

Table 25. The Coefficient Correlations between each component of reading literacy and academic achievement

Student Number	N=1098	N=700(B)	N=398(G)
Docu/AA	.59	.57	.64
GRA/AA	.61	.54	.72

The relationship between each component of reading literacy and each subject at KCPE was significant. There was, however a higher coefficient of correlation for girls as opposed to the boys when each gender was looked upon individually. It appears that girls are more dependent on reading literacy when they perform on the subjects at the KCPE as opposed to the boys. The correlation of .72 between GRA and academic achievement is indeed impressive. Obviously, girls are more dependent on reading comprehension for obtaining success in academic subjects.

Table 26. The relationships between each component of reading literacy and each subjects at KCPE.

Variable	ENGL	GEOG	HSCI	KISW	MATH	MUSI	SCIE
Gender	G (B)	G (B)	G (B)	G (B)	G (B)	G (B)	G (B)
DOCU	.61 (.49)	.50 (.42)	.48 (.43)	.52 (.33)	.51 (.40)	.49 (.40)	.44 (.41)
GRA	.64 (.53)	.57 (.44)	.61 (.43)	.55 (.31)	.55 (.29)	.52 (.32)	.54 (.40)

When specific subjects were considered one can see, in Table 26, that the correlation between GRA and Math is much higher for girls than for boys .55 (.29) indicating that even in Math girls are more dependent on reading than boys. The relationships between the two components of reading literacy, documentary and GRA, and academic achievement indicated that each component of reading literacy is a good indicator of academic achievement.

Each passage of reading literacy and each subject at KCPE gender wise

Table 27. The relationships between each passage of reading literacy and each subject at KCPE gender wise

Variable	ENGL	GEOG	HSCI	KISW	MATH	MUSI	SCIE
Gender	G (B)	G (B)	G (B)	G (B)	G (B)	G (B)	G (B)
BUS	.32 (.22)	.31 (.21)	.29 (.22)	.26 (.19)	.32 (.22)	.26 (.20)	.26 (.23)
CARD	.50 (.36)	.36 (.23)	.36 (.30)	.48 (.24)	.32 (.23)	.28 (.23)	.28 (.27)
DIRE	.41 (.33)	.26 (.29)	.30 (.29)	.32 (.17)	.34 (.33)	.31 (.30)	.27 (.29)
GLOB	.37 (.34)	.33 (.28)	.28 (.29)	.30 (.23)	.33 (.30)	.41 (.27)	.30 (.25)
JOB	.31 (.27)	.22 (.20)	.21 (.19)	.24 (.22)	.22 (.08)	.21 (.14)	.21 (.18)
RESO	.37 (.21)	.37 (.19)	.30 (.19)	.33 (.11)	.33 (.15)	.35 (.19)	.32 (.17)
VITA	.30 (.23)	.34 (.27)	.32 (.22)	.26 (.15)	.34 (.22)	.32 (.26)	.31 (.21)
LASE	.40 (.31)	.34 (.31)	.36 (.26)	.37 (.17)	.33 (.21)	.31 (.26)	.29 (.25)
MARM	.44 (.29)	.34 (.23)	.38 (.19)	.34 (.21)	.39 (.14)	.39 (.20)	.32 (.24)
PARA	.52 (.32)	.47 (.31)	.47 (.29)	.44 (.23)	.40 (.14)	.39 (.17)	.45 (.26)
SMOK	.49 (.40)	.48 (.31)	.50 (.31)	.43 (.20)	.43 (.23)	.42 (.29)	.45 (.29)
WOMA	.31 (.28)	.29 (.25)	.36 (.25)	.25 (.21)	.32 (.18)	.27 (.19)	.30 (.23)

According to Table 27, when each passage of reading literacy and each subject is considered, girls have consistently higher correlations as opposed to the boys. These correlations show once again that girls' reading achievement relates more favourably to their performance on each subject at KCPE than boys.

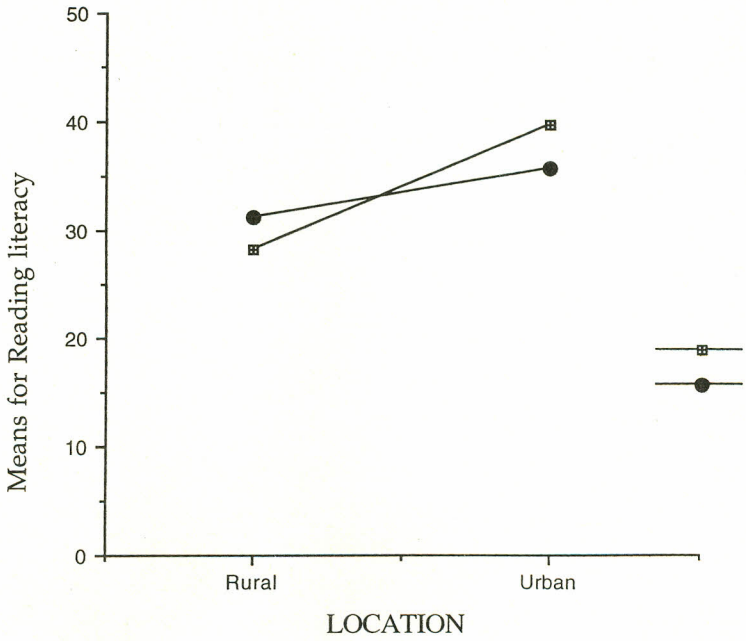

Figure 13. Mean reading literacy performance by school location.

As can be seen from Figure 13, the level of reading literacy seems interact with gender and location in such a away that urban g are better than urban boys whereas the opposite pattern is evid at the rural level.

A two way ANOVA on reading literacy data confirmed t observation by a significant effect of location F(1, 1097) = 293.6, Se = 2949.9, p<.001 and a non significant effect of gend However, there was a significant interaction effect F(1, 1097 66.9, M Se = 2949.9, p<.001. (see Figure 13).

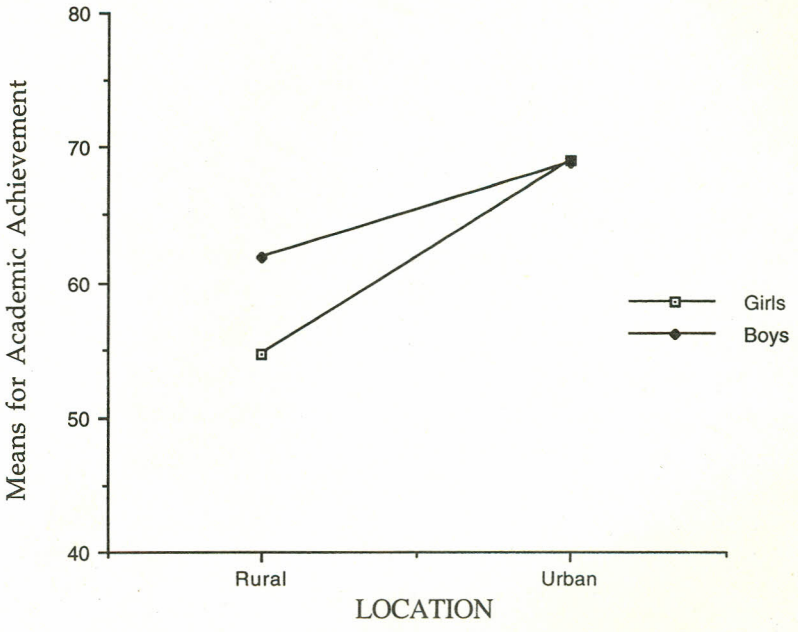

Fig. 14. Mean performance of academic achievement by school location.

Figure 14 summarizes the mean performance on academic achievement. What is readily evident is that gender seems to interact with location in such away that boys have a higher level of performance on academic achievement than girls at the rural level. However, there is no gender difference at the urban level. A corresponding two way ANOVA on academic achievement data corroborated this result by depicting a significant main effects of gender $F(1, 1097) = 45.4$, M Se = 13898.2, $p<.001$, and location $F(1, 1097) = 214.5$, M Se = 23611.5, $p<.001$. The interaction had $F(1, 1097) = 28.6$

M Se = 3144.1, $p<.001$. (see Figure 14).

Interviews

Basically, this is a study that uses quantitative tools in its measures and obviously a large number of cases. However, despite the fact that it may capture interesting structures, there are certain dimensions of reading literacy that are not well taken care of; as to such, a qualitative approach by the use of interview was desirable to supplement the quantitative one. Even so, interview may not be free from some shortcomings as well in letting the students portray their inner feelings. Culturally Kenyan students find it quite difficult to go into deep feeling of expressions with a person who assumes positions of authority as the researcher in this study. But it was still deemed worth an attempt to augment the quantitative approach.

Of the six interviewees, each was asked questions which they responded individually to before the researcher. The recording of the interview was done by the researcher. For formality reasons, each interviewee introduced himself/herself by stating their names, class, school, and province after which the interview commenced. The first three interviewees were from Kisumu Girls High School and the last three from Maseno Boys High School. The interview proceeded as follows:

Interviewee 1. (Girl).

Q. What does reading mean to you personally?
A. Reading? It helps me in reading my letters when the letters are written to me by my parents or my brothers and sisters.
Q. Is that all?
A. No. It also helps me in reading books like those for History, Geography and Civics.
Q. But how has reading helped you personally?
A. It is helping to prepare to be a good leader in the future.
Q. How is this possible?
A. Well, first I have to finish my schooling then later, if I succeed, I can become a leader.
Q. How else has reading been beneficial to you?

A. Reading has helped in learning Kiswahili and English so I find it easy to communicate with people from other tribes in the market places. It has also helped me know how to read signs on the roads.
Q. Do you have any access to the daily newspapers?
A. Yes.
Q. Which ones?
A. Nation, Standard, Kenya Times, and Taifa Leo.
Q. How have you been able to benefit from these dailies?
A. They help me in knowing both local and international news. The newspapers also in knowing what my stars say in the stars column.
Q. Why is education important to you?
A. I want to be a professional.
Q. So, how many more years of education do you anticipate?
A. I plan to study upto the university so I have about 7-8 years of education to go.
Q. What do you plan to become professionally?
A. I hope to be a lawyer.
Q. Why a lawyer?
A. It is my dream to maintain justice.

Interviewee 2. (Girl).

Q. To you what are the benefits of being able read?
A. The benefits of reading to me are many.
Q. Can you tell me a few?
A. Reading newspapers, watching TV, helping my grandparents by translating for them the things they do not understand on the TV programmes.
Q. Do you have a TV at home?
A. Yes.
Q. What kind of TV? A coloured one, is it?
A. Coloured.
Q. What is your source of power for running the TV?
A. A generator.
Q. What programmes, if any, do you like watching on TV?
A. I like cartoon programmes. They make people happy.
Q. How has reading helped you in your life?
A. I can read stories, newspapers, and novels.
Q. Is that all?

A. No. It has also helped me in my regular school subjects like French, social ethics, and others like mathematics.

Interviewee 3. (Girl).

Q. What are the benefits of attending school?
A. It helps me to be occupied with useful tasks unlike my age-mates who are not in school.
Q. Is there any significance of your ability to read in your village?
A. Yes. I have been of great help to the elderly, who can not read, by reading for them their letters. I also feel quite satisfied when I help in reading Bible texts when such an opportunity arise in my church.
Q. Is there any other way by which reading has been beneficial to you in your village?
A. Reading has helped me in following hygiene instructions like "prevention is better than cure programmes in the country. When posters are put on how we can prevent epidemics I help others in understanding what is written on the posters.
Q. Do you have a radio at home?
A. Yes.
Q. Has the radio been of any help?
A. Yes. Radio programmes like "Arende" helps in inculcating the right values among the youth.
Q. What are your educational plans?
A. I intend to reach university. Possibly become a doctor and help the people who are suffering from malaria in my village.

Interviewee 4. (Boy).

Q. Do you have a radio at home?
A. Yes.
Q. Have you been able to benefit from it?
A. It has helped me to know what is going on in the country and international news as well.
Q. Do you have access to any of the local dailies?
A. Yes. Nation.
Q. What areas do you like reading in the Nation?
A. I like reading the sports and stars columns.
Q. Do you have any future educational plans?

A. Yes.
Q. And what is it?
A I want to become a doctor.
Q. Why have you chosen to be a doctor and yet it demands so many years of education?
A. I want to help my fellow countrymen by reducing death rates in helping people like the victims of aids.
Q. What message would you have for your age-mates who can not read or write?
A. In the future it will almost be impossible to survive in the society without being literate with the advancement in technology.

Interviewee 5. (Boy).

Q. Has, being able to read, been of any use to you as a person?
A. Yes, many times.
Q Can you tell me a few of such cases?
A. Reading has enabled me to translate for my grandfather English and Kiswahili programmes from the TV and radio. Being able to read, has made me feel more confident.
Q. How?
A. Nobody can cheat me by giving me the wrong change at the shop and I can read the road signs by myself without depending on somebody else.
Q. What radio programmes do you like?
A. "Yaw Pachi".
Q. What kind of programme is this?
A. This is a programme that warns youngsters to beware of social evils like drugs, alcoholism, and the like.
Q. What is your future educational plans?
A. I want to be a lawyer in ten years time.
Q. Why a lawyer?
A. I want law and order to be maintained in this society and the best way is to be in responsible position myself.

nterviewee 6. (Boy).

Q. Is there any benefit of being able to read that you say has affected you personally?

A. Reading has helped me in reading bus timetable, for example, and the bus conductors can not cheat me as they do to the illiterate.
Q. Is that all?
A. No. Even in Kisumu here, reading has enabled me to read road signs, for instance when going to Oginga Odinga Road, crooks can not cheat me because I do not ask them for directions. I know where to go.
Q. How has your reading ability been helpful in your academic life?
A. Well, I managed to come to Maseno High School because of hard work and also because I could read and understand the questions at KCPE that is why I am here.
Q. What would be your message to other young people who are not as privileged enough to be able to read?
A. They should all understand that being literate helps one prepare for life.

Comments on the interview

The responses on the interview can be categorized into four, namely: compliance, functionality, social image, and self confidence.

1. *Compliance*

It appears that the students in Kenya are quite interested in maintenance of the way the people in the community deem fit and they would rather please the members of the community than please oneself. Therefore such responses to the programmes that the students enjoy listening to from the radio or watching on have some level of compliance to the social demands.

An illustration of this point was vividly expressed in the following portion of an interview:
Q. Has the radio been of any help?
A. " Yes. Radio programmes like "Arende" helps in inculcating the right values among the youth." Another example was the following response to a question posed to another interviewee:
Q. What radio programmes do you like?
A. " Yaw Pachi".

Q. What kind of programme is this?
A. This is a programme that warns youngsters to beware of social evils like drugs, alcoholism, and the like.
The interviewees here attempt to tell the researcher what is deemed fit to listen to on the radio programmes leave alone the youths' favourites like popular music.

2. *Functionality*

One of the benefits of reading literacy in the life of a student is when it opens the eye of a student in a functional way to the world. Such a benefit as being able to give the right change in the market transaction, being able to read road signs, or bus timetable hence cannot be easily cheated.

A typical example of this can be seen in the response of one of the interviewees.
Q. Is there any benefit of being able to read that you say has affected you personally?
A. " Reading has helped me in reading bus timetable, for example, and the bus conductors can not cheat me as they do to the illiterates."
Q. Is that all?
A. " No. Even in Kisumu here, reading has enabled me to read road signs, for instance when going to Oginga Odinga Road, crooks can not cheat me because I do not ask them for directions. I know where to go."

3. *Social image*

The idea of being able to gain a social status in the society is evident from the answers to the questions paused at the interview like being thought of as a person who helps others in the society by reading for an elderly person who cannot read is a good merit for one's social image.

A good example of this was shown in the answers given by an interviewee as follows:
Q. Is there any significance of your ability to read in your village?

A. " Yes. I have been of great help to the elderly, who can not read, by reading for them their letters. I also feel quite satisfied when I help in reading Bible texts when such an opportunity arise in my church."

4. *Self confidence*

It was evident from the interviews that having been able to read there is an additional confidence among students that they are capable of achieving academic success as well in other areas. This was clearly demonstrated in their goals such as future professional careers.

A good example of this would be:
Q. So, how many more years of education do you anticipate?
A. " I plan to study upto the university so I have about 7-8 years of education to go."

It was interesting to note that such fundamental rewards of literacy pervaded the responses of the Kenyan students.

Although this qualitative approach of interviewing was to supplement the quantitative approach in the study by capturing some underlying features of reading literacy, this kind of interview does not reveal very well certain key factors as already emphasized in Chapter One and Three. Reading is basically a cultural practice. The deeper understanding of the socio-cultural dimensions of reading, what reading means in everyday life, the value systems attached to reading etc. require a more qualitative approach. It was also considered necessary to attempt to establish an interpretational framework of the study where the cultural dimension is incorporated. It was still deemed worth an attempt to augment the actual use of reading as an instrumental skill and as a tool for personal development, the emotions related to reading etc. In addition there was a tendency of students to respond according to what is deemed fit in the society. Thus, an actual life observation of this group of students could probably give a better picture.

Chapter Six

Summary and Conclusions

This chapter presents a summary and conclusions based on findings of the study.

The study paid special attention to the relationship between reading literacy and academic achievement. It was particularly concerned with the examination of the structural relationships between the constructs of reading literacy and academic achievement. By working with latent variables, an estimate without errors of measurement between reading literacy and academic achievement was observed. An evaluation of the impact of voluntary reading process and background factors were also examined. Apart from the relationships being studied at a general level, more specific examination with reference to gender differences and the location of the schools either urban or rural was also considered.

Theoretical Issues

The study was based on assumptions that there is relationship between reading literacy and academic achievement. Daneman (1991) stated that low achievement on reading leads to low academic achievement. However much could only be explored to get to grips with the deeper levels of relationships at a much finer detail. For example, are there specific domains of reading literacy that can be related to certain aspects of academic achievement? Are there some other underlying factors that could be affecting achievement on reading literacy and academic achievement? Are there differences related to specific tasks on reading and academic achievement, or is there one general ability that cuts across all performance in reading and academic achievement?

Studies by Elley (1992), Wagner (1992), Lundberg (1991), and Lundberg & Rosén (1995) indicate that reading literacy, in its wholistic definition, entails more than just the decoding of words and texts but also in a functional way engrosses such areas as

coping with context specific demands as reading notices, newspapers, graphs, tables, directions, circulars etc. There are background factors that have impact on reading that sometimes go unnoticed, for example, home and school conditions, reading opportunities and voluntary reading are related to achievement in reading and in academic subjects taught in schools (Postlethwaite & Ross, 1992; Elley, 1992, Lundberg & Linnakylä, 1992).

Research on intellectual abilities has been an area of controversial debate particularly with reference to gender differences. Therefore in a study of this nature that touches such abilities, it was appropriate to look at the contemporary stand held among researchers and see what the relationship is to the findings in the present study.

Concerning the location of schools, Postlethwaite and Ross (1992) reported better achievement in reading among urban than rural schools. However, they noted that there were some rural schools which were effective as well but these were very few.

The findings of the present study were examined in the light of the theoretical issues and the corresponding interpretations were made according to the context of the country and the population sample of students under the study.

Main Findings

Reading Literacy

The IEA reading literacy test which was used as a measure for reading literacy in this study seemed to be a reliable indicator of reading ability.

A high mean on the reading literacy test should be understood in its right perspective. It should be understood that the population sample of the students in the study was special. The level of performance that was achieved in this study does not reflect the performance of the target population. First, because the study was done on a judgmental sample. Second, the fact that only the

successful students at KCPE which comprises only 27 percent of the population participated. The variation in performance among students shows the variability among schools under the study that ranged from district secondary schools to those of national reputation. Lastly, a considerably high reliability was expected because the IEA reading test had shown good reliability.

At a more structural level, the measurement model showed deeper aspects of reading literacy constituents such as the documentary and the general reading domains It was found that there are two factors in the reading literacy test: the general reading ability interpreted as processing of connected texts that covers most of the items with very few exceptions; and it was also established that those items related to the identification, location and associations of information in brief documents like tables, graphs, maps belong to the documentary domain of reading.

Voluntary reading

When voluntary reading was explored from the IEA reading literacy student questionnaire, a good measurement model was realized that encompasses seven different types of voluntary reading that cut across channels of reading (romance, entertainment, superficial, sports, travel, news and politics and classical). It is important to note that voluntary reading related significantly with both performance on reading and academic achievement.

Academic Achievement

There was clear evidence, at the measurement model level, that the two postulated components of academic achievement, namely general reasoning ability and verbal ability were the latent factors. The former was the main factor underlying most subjects at KCPE (Geography, Home science, Math, Music, and Science). It seems to involve factual information, problem solving, decision making, judgement, spatial reasoning etc. It was a good indicator for performance in the mentioned subjects at KCPE. The latter was

connected to subjects loaded mainly with connected texts such as English and Kiswahili.

Verbal ability is a very important indicator for the Kenyan setting because it is an integral part of proficiency in a second language. More so, performance on reading literacy test and each subject at KCPE show a high correlation with English which in this case was a major indicator of verbal ability. The result is important in that English is a learning tool on which all other subjects, except Kiswahili, depend in Kenya. There is an unwritten law that a pupil is expected to know English at the onset of the nursery school, if not the first grade. This law seems to prevail especially in those catchment areas where there is multi-ethnicity like metropolitan areas where it is almost impossible to use one's mother tongue as a medium for communication and instruction. Therefore the success of a pupil during this crucial period is mainly dependent on an ability to come in terms with a foreign language, English. For most children this may be a nightmare and the first lessons in reading and writing even arithmetic can be a literal hell. Probably, the whole learning process could be more enjoyable for a pupil if his/her mother tongue was equally valued at least for the first few years to go hand in hand with English to have a much stronger foundation on verbal ability and possibly general reasoning ability because these two abilities appear to be highly interrelated.

Gender wise, it was noted that there was no significant difference in performance on reading literacy between boys and girls. However, boys had a higher mean performance among the subjects at KCPE than that of girls.

There was an apparent difference in performance between boys and girls in this study. Boys had consistently higher mean performance than that of girls. The gender difference could be due to a number of factors in the Kenyan setting. The first reason may be that male students are given more opportunities. Boys are generally encouraged to excel in academics at the expense of girls. The reason being that girls during marriage leave their parents hence a liability. However, this perception is drastically changing. But the girls who still enjoy the benefit of secondary education, especially in

the urban centres perform equally well. The second reason is that male teachers are the ones who dominate, in terms of proportion, in the teaching career thus a constant motivation for boys to perform better because they provide boys with models to emulate.

At the measurement model level which was more refined, there was no significant differences between the models for boys and that of girls according to the number of paths patterns from the documentary and general reading ability domains of reading literacy. The separate gender models proved to be a good cross validation of the workability of part of the model in Figure 3 that deals with reading literacy and academic achievement.

Background factors

The four background factors (home literacy, home possessions, student activities, and student's self concept) in the present study, showed that nothing should be taken for granted. The results indicated that the background factors had an impact on a student's performance at the reading literacy test, academic achievement, and on voluntary reading. Thus, the study supported the notion that a conducive environment fosters reading and academic achievements over and above the teaching in school.
In addition, a student with good attitude toward himself/herself and toward education seems to be a good achiever in the reading literacy test and KCPE subjects.

School location

The results in this study indicated a significant difference of mean performance between rural and urban schools. This finding is consistent with the IEA study reported by Postlethwaite and Ross (1993) that students from urban schools had better achievement on reading than those from rural schools. The differences in achievement both in reading literacy test and KCPE among Kenyan students could be accounted for by a number of factors, namely: good teachers strive to teach in urban secondary schools because living standards are much better in comparison to the rural settings; schools in the urban areas have better facilities due to better

organized school-boards and better financial backing in the cost sharing policy in school management; and easy accessibility, for example, the inspectorate can easily check the progress of such schools and the press can easily pick up any anomaly in the school. Interaction effects were observed in reading literacy between gender and location, and in academic achievement there was interaction as well between gender and location.

Reading Literacy and Academic Achievement

The main purpose of this study was basically to examine the structural relationships between the constructs of reading literacy and academic achievement. This has been attempted by examining the correlation between both reading literacy and academic achievement in the main measurement model. An error free high correlation was established between general reading ability and academic achievement. This relationship was impressively significant and indicates the impact general reading ability appears to have on academic achievement. In addition, there were also significant relationships at the gender levels when each domain of reading literacy was correlated with performance on academic achievement individually. These relationships were seen as being consistently in favour of girls. A possible explanation for high correlations between girls' performance and their academic achievement may be as a result of their adherence to instruction and loyalty thus taking each exercise seriously hence reducing noise in their data leading to higher correlation values (see Munck and Taube, in press; Wagemaker, in press)

Conclusions

Conclusions in the present study could only be meaningful if they were seen in the light of the theoretical model for the study in Figure 3.

To the left of the model, it appears, according to the findings, that the background factors indeed have some degree of influence on both reading literacy and academic achievement. There is variation in performance on reading literacy and academic achievement that

appear to be related to home and school conditions, reading opportunities, voluntary reading, and social status level from which a student comes, and other influences like TV watching, etc. More so, about 4 percent of such influences contribute to the relationship between reading literacy and academic achievement.

Considering the middle part of the theoretical model, reading literacy, as measured by the IEA reading literacy test, is divisible into two deeper aspects, namely: general reading ability and documentary domains which are important in understanding reading literacy.

A look at academic achievement, as was measured by subjects at KCPE, to the right of the theoretical model, indicates that it is composed of a factor that seems to cut across most of the subjects at KCPE, general reasoning ability, and another factor, verbal ability, that relates to reading literacy at a much higher level than general reasoning ability. This may be due to the former being involved more with continuous reading of connected texts unlike the latter. However, document aspect of reading ability has generally low correlations with both verbal and general reasoning abilities.

Viewing the model as a whole, the correlation between the constructs of reading literacy and academic achievement indicates that there exists a substantial relationship. Based on the conceptual framework for the present study, it is indicative that the measurement model that combines both reading literacy and academic achievement works. This seems to show that there are deeper underlying structural relationships between reading literacy and academic achievement. The model further corroborates that those domains which are crucially embedded in reading literacy such as general reading ability and documentary aspects, are in one way or the other having connections to general reasoning and verbal abilities. In essence, general reading ability appears to affect performance in academic achievement. This suggests that to understand students performance on academic achievement better, one should look at their reading literacy level as well.

Finally, the responses on the interview in this study seemed to show that there are underlying fundamental attributes that reading literacy adds to an individual such as compliance, functionality, social image, and self confidence which contribute to a student's desire of being literate in Kenya.

Problems encountered in the study

Although the data, findings, and discussions have been presented in this chapter, there were problems that could not be resolved in the present study.

1. For one to get a fuller variation among the classes and exploit the multi-level character of the data, more than the 27 classes in the present study is required.

2. Apparently, questionnaire data is not enough in capturing what actually goes on in a classroom setting accurately. So, probably such a survey study should be supplemented by in depth interviews and careful classroom observation to avoid compliance effect and get a richer qualitative picture.

3. The 14 year old students must have had varied histories of teaching before joining secondary schools which could not be captured. These experiences might have some relevance to their achievement in reading literacy and academically. A longitudinal study involving growth curve analysis would have answered important questions on the course of development of reading literacy and academic achievement and its determinants.

4. There is a large set of possible influences (teaching effects, teachers' readership, teaching strategies, school resources etc.) which have not been brought up due to some limitations mentioned.

5. The performance of the Kenyan students on the reading literacy test in this study is not comparable to that of the other countries which participated in the earlier IEA reading studies because the judgmental sampling technique used here is deemed not be a national representation of the group under the study.

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