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SCHOOL CERTIFICATE PERFORMANCE AS A PREDICTOR  
OF SUCCESS AT HIGHER SCHOOL EDUCATION

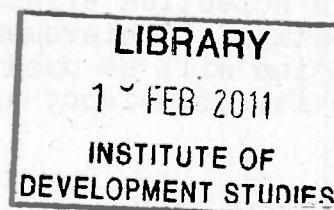
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ABSTRACT

There are two critical filtering points in the highly selective Kenya's educational system: Certificate of Primary Education (CPE) and East African Certificate of Education (EACE). The performance of a pupil in EACE is critical in determining whether or not he gains access to one of the scarce wage paying opportunities. Because the rewards offered by society relate so closely to the individual's performance in this examination it becomes very important to see whether the examination is allocating these chances efficiently and equitably.

The purpose of this research proposal is to investigate the selection efficiency of East African Certificate of Education. Achievement in Higher School Certificate examination will be used as a criterion against which to measure its efficiency as a selection device.

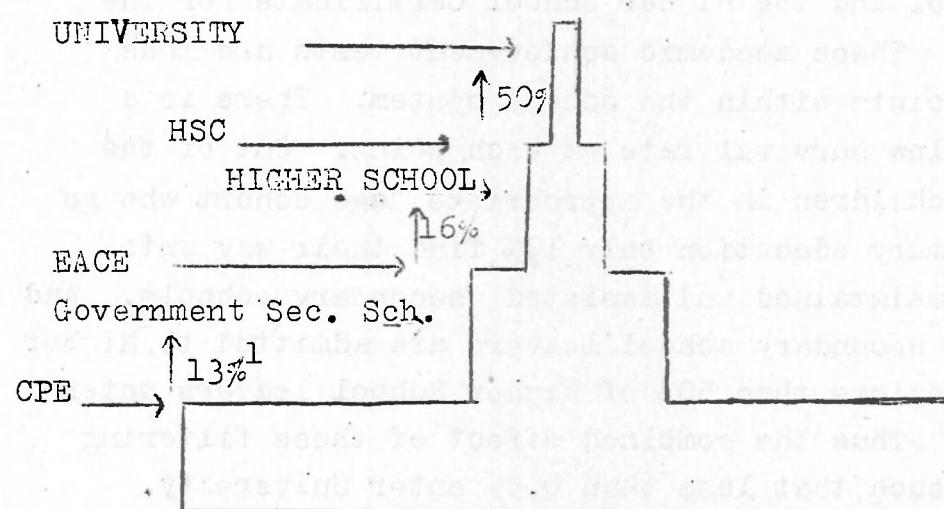
INSTITUTE OF  
DEVELOPMENT STUDIES

## SCHOOL CERTIFICATE PERFORMANCE AS A PREDICTOR OF SUCCESS AT HIGHER SCHOOL EDUCATION

### THE BACKGROUND TO THE PROBLEM:

Formal education in Kenya is highly selective. The first selection is done right at the initial entry point since not all children have access to a standard One class which is the first rung of the education ladder. About 60% of children in the appropriate age cohort in Kenya enter Primary School every year. However, only an extremely small proportion of this cohort (less than 0.5%) survives to enter the University.

The selective nature of this system is realized fully when it is illustrated with a pyramid.



Primary School entrants are 60% of children in the appropriate age cohort.

The broad base of the pyramid represents primary education while the apex represents University education. The Middle layers comprise secondary and higher school education

1. There is another 17% of primary school leavers who find their way into Harambee and Commercial Secondary Schools. The intake in these schools is non-selective. Any pupil can be assured of a place provided he can find the fees.

respectively. It is likely that the base of the educational pyramid will expand in 1974 due to the extra intake into Standard One following the Presidential Decree granting free primary education for Class I-IV pupils.

This educational system has a number of features. Some of them are the academic achievement tests which are sat for by pupils at the end of every level of education. These examinations meet two needs. They mark the end of a particular stage of school education. But; more important they provide a criterion for selecting assumedly able pupils for the next stage of school education. The certificate of primary education chooses pupils for secondary education, the East African Certificate of Education for Higher School and the Higher School Certificate for the University. These academic achievement tests are thus filtering points within the school system. There is a remarkably low survival rate at each point. Out of the 60% of the children in the appropriate age cohort who go through primary education only 13% find their way into government maintained and assisted secondary schools. And only 16% of secondary school leavers are admitted to Higher School while less than 50% of Higher School leavers enter University. Thus the combined effect of these filtering points is such that less than 0.5% enter University.

In the Kenyan situation educational success is closely related to subsequent income. A holder of the Certificate of Primary Education would perhaps earn not more than the national per capita income. This category of school leavers can expect to earn less than Shs. 200/= per month. The median income for holders of East African Certificate of Education (EACE) one year after school is shs. 440/=-, according to primary data from the on-going Tracer Project. A holder of a Higher School Certificate earns about shs. 800-900/=-, that is double the income of an EACE holder. The income differential attached to these filtering points is maintained all the way to the top of the education hierarchy. Thus a University graduate who holds a first degree earns at least



double the income of a HSC holder, that it about shs. 1600/= per month. Because the rewards offered by society are so critically dependent on educational certification, it becomes very important to see whether the examinations are allocating these chances effeciently and equitably.

The East African Certificate of Education, is a critical filtering point because:

- a) Those who enter form V and others who secure the first and second divisions, are assured of a modern sector job, whereas those who do not are not assured.
- b) Those who enter Form V, and others who secure the first and second divisions are the potential members of Kenya's economic, social and intellectual elite. Those who do not go on with their formal education have a much more difficult time breaking through the barriers.

TABLE 1

Shows No. of Candidates and No. of Passes in The O-Level (F.IV) and A-Level (F.VI) Examinations

	1963	1965	1967	1969	1971	1973
O-Level Sch. Candidates	4441	5878	9446	16973	22517	28864
O-Level Passes Div. I, II, III and EACE <sup>3</sup>	3201	5309	8046	14413	18435	?
Percentage	72.08	90.31	85.17	84.91	81.87	
A-Level Sch. Candidates	441	584	946	1494	2448	3487
A-Level Sch. Passes, at least One principal	241	272	398	894	1899	
Percentage	54.6	46.57	42.07	59.83	77.57	?

Sources: Ministry of Education Annual Reports.

3. Pupils are grouped into categories according to their quality of performance in this examination. The categories are Divisions I, II, III, and EACE. An EACE is a mere pass whose value in the imbalanced labour market is negligible. An annual average of about 28%, a disproportionately high percentage of candidates fall within this caterogy. And about 56% secure Division I, II, and III. The rest, about 16% fail the examination.

In fact, this category of school leavers referred above is only a very small proportion of secondary school leavers. As the table above illustrates, out of 4,441 EACE candidates in 1963 only 13.2% sat for Higher School Certificate in 1965.<sup>2</sup> And out of the 16,973 candidates who sat for the EACE in 1969, only 14.42% sat for Higher School Certificate in 1971. In fact out of 28,864 form four pupils who sat for the EACE in 1973, only about 4,650 (16.0 percent) will have access to post secondary education.

#### Review of Literature.

Much useful work has been done concerning the filters inside the formal education system. Paul A. Schwarz and Robert E. King introduce their paper entitled "Ability Testing in Developing Countries"<sup>4</sup> with an emphasis in the great importance of selecting the few most able people available among applicants for jobs or for further education in countries where job and school openings are limited, and where national development depends on efforts of a relatively small number of people. The selection mechanism used mostly is the academic achievement test. This, they observe, is a poor predictor of performance at secondary school level, but the best predictor of scholastic success at University level in U.S.A. Hence, the need to develop efficient selection procedures which would identify the pupils most capable of profiting from school education. An achievement test will be an efficient predictor of scholastic success if:

- a) Candidates have had the same educational experience.
- b) Differences in their achievements were the result of certain differences in their individual abilities and characteristics.
- c) The advanced courses to be undertaken will require the same abilities and characteristics.

2. Higher School Education is a two year course which comprises form five and six.

4. See Schwarz, Paul A., and King Robert E., "Ability Testing in Developing Countries." Development Digest Vol. X. No. 4, October, 1972, pp. 103-124.

But even then, human beings have an enormous and often unrecognized capacity for intellectual change and development. Thus any prediction based on performance at one point of time is bound to be subject to a wide margin of error.

T.C.I. Ryan and Mrs. F. Stewart in their study of Nairobi University students explained variations in performance in the first year University economics examination by previous educational background.<sup>5</sup> Educational background comprises O-Level; A-Level; O-level mathematics, and A-Level economics. Their sample was stratified on the determinant variable "pupils experience in economics as a part of educational background". Correlation values were calculated for the two sub-samples namely with-economics, and without-economics, between their O-level performance and A-level performance. This exercise yielded correlations of 0.234 and 0.212 for the pupils with-economics and without-economics respectively. They also found that general performance in O-level and A-level individually offer a partial explanation of variation in University performance. Taken together for "with-economics" they explain about 23% of the variance with results in A-level having greater significance than results in O-level. For category "without-economics", the regression gave a less good fit with around 18% of the variance explained.

John Jones and Richard T. Johnson also consider the filters inside the formal education system as a problem area.<sup>6</sup> They argue that if a University is to play its optimum role in the development of a country, it is imperative that the selection mechanism be an effective mechanism and single out those candidates most likely to be successful. They observe that most entrance criteria currently in use in Eastern and Southern Africa are not efficient. Failure and drop out rates (with accompanying frustrations, disappointments and hostilities generated) are considered to be intolerably high

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5. Ryan, T.C.I. and Mrs. Stewart, F., School Background as Predictor of First year Economics Performance. Staff Paper No. 77, Institute for Development Studies, University College, Nairobi. 1970.

6. Jones, John and Johnson, Richard T. "School Certificate Results as Predictors of Success at University". Education in Eastern Africa Vol. 2, No. 2. 1971. pp. 55-62.



in many institutions. Selection at the University of Malawi is based almost entirely on results which candidates obtained in the Cambridge Overseas School Certificate (COSC). Therefore, they calculated the correlation coefficients for COSC results and end of the first year results at the University. Some of their findings are:-

- i) COSC Science results correlate positively with University science results. For instance, O-level maths, Phys/Chem; General science and Biology have average correlations with University first year Biology of 0.321, 0.550, 0.418, and 0.470 respectively. Thus each of the above subjects has a common variance with the University first year Biology of 10%, 30%, 18% and 22% respectively.
- ii) On the whole COSC English results correlate with University results. Correlations between these two examinations range from 0.286 to 0.543 at .01 level of significance. According to these findings, the power of O-level English to predict University first year English varies a great deal, (8%-29%) over several years.
- iii) There is no significant positive correlation between COSC English and University Science or between COSC Science and University English. The only significant correlations in this class are negative; these are the English/Maths correlations. These correlations have an average of about - .160 at no level of significance although some individual events are significant to .05 level.

The majority of scholars in this field think of filtering as a problem because it is a process which involves selecting a very small number of capable individuals from a large population. This is a unidimensional approach to the problem. But H.C.A. Somerset unlike the others, states clearly that this is not a mere problem of selecting a small number of able candidates, rather it involves, to a serious extent, the issue of equity among members of a society.

"The Certificate of Primary Education (CPE) determines the whole destiny of a child. If he passes well and enters a Government secondary school he has a good chance of ultimately entering a job where his income may reach ten, twenty, or even one hundred times the national per capita income. But

if he fails, his lifetime earnings may not amount to much more than those of someone with no formal education".<sup>7</sup>

If he passes well and enters a government secondary school, and IF he passes well the East African Certificate of Education (EACE) and enters form 5, he becomes a potential member of Kenya's economic, social and intellectual elite. But if he does not, he has much more difficult time or he might never in his lifetime be able to break through the barriers.

H.C.A. Somerset in a study in Uganda on the efficiency of the Junior Secondary Leaving Examination (JSLE) in identifying pupils with the potential to succeed in Cambridge School Certificate obtained correlations of 0.374 and 0.428 for boys and girls respectively.<sup>8</sup> Thus according to his statistical findings, the selection examination and the O-level examination had well under 20% common variance. Also his finding on the regression of O-level performance on selection Examination performance was curvilinear for both sexes. Some of his other findings are:-

- i) A high proportion of the most successful O-level candidates had been lucky to get into secondary school at all on their selection examination marks;
- ii) Some subjects are better predictors of school certificate performance. It was found that JSLE Mathematics, is a good predictor of school certificate performance in subjects of the numerical sciences group (Mathematics, Physics, Chemistry), and that JSLE English Comprehension predicts performance in the non-science subjects fairly well.
- iii) Elementary school quality affects the performance at secondary school level.

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7. Somerset, H.C.A. "Who Goes to Secondary School? Efficiency, Equity, and Relevance in Secondary School Selection" in David Court, D.P. Ghai (eds.) Education, Society and Development: New Perspectives from Kenya. Nairobi, the Oxford University Press (Forthcoming).

8. For a detailed discussion of the predictive validity of the selection examination and the reasons for the low validity of the selection see Somerset, H.C.A. Predicting Success in School Certificate East African Publishing House, 1968, pp. 12, and 95.

Unfortunately very little investigation has been done in the related field of educational performance as predictor of job success in the less developed economies and Kenya in particular. The fact that a Bank Manager would first employ a school leaver who attains a second division and not a third division in the school certificate of education does not necessarily mean that the former is a more productive employee than the latter. Instead it indicates that the education system has pumped out more school leavers who are capable of doing the same jobs than the employers can absorb. Fortunately for the employers, the education system differentiates its product by means of certificates which are graded according to the performance in the academic achievement test, thus providing the employers and other post secondary institutions with a selection criterion. P.K. Kinyanjui in "Education, Training and Employment of Secondary School Leavers in Kenya" notes that:

"The correlation with E.A.C.E. results shows that the ablest students are going on with further education of some sort, and that the labour market is selective in terms of performance in E.A.C.E. - those with the poorest aggregate scores are remaining unemployed longest".<sup>9</sup> (the emphasis is mine).

There is however, a missing link in study which tries to find out whether the assumption of selecting workers on basis of performance in academic examinations is valid or not. The fact that school leavers with better examination marks are also more productive workers has to be established yet.

The brief discussion which follows depends heavily on a book by Ivar Berg, entitled "Education and Jobs: The Great Training Robbery".<sup>10</sup> Among his findings he observes that the American labour force tends to achieve more education than is required for the existing jobs in the economy. In the

9. Kinyanjui, P.K. Education, Training, and Employment of Secondary School Leavers in Kenya. Discussion Paper No. 138, Institute for Development Studies, University of Nairobi, August, 1972.

10. Berg, Ivar. Education and Jobs: The Great Training Robbery Beacon Press, Boston 1971. pp. 38 - 175.



face of this trend, he argues, the society may be able to absorb more highly educated people by redefining the requirements for employment, if not the job itself. Such a trend by all means would lead to underemployment in the sense that people would not be using their talents. A move to upgrade the content of education required in work opportunities hits back by displacing a significant population who must compete for jobs once held by people of modest educational achievement. In Kenya, for instance entry standards have gone up, a school certificate is now required for entry into many training schemes and jobs which were previously open to primary school leavers. Berg also did an investigation on the relationship between educational achievement and worker performance. He found an inverse association between the two on blue collar workers, and only a slightly positive one for white collar workers.

John Simmons did a study in Tunisia on relative contributions made by formal schooling and informal education to earnings, and he found that formal education plays a weak role in the earnings of a blue collar worker.<sup>11</sup> This finding is therefore consistent with the growing body of evidence on American workers. Although there is no documented evidence yet, the Kenyan situation might not be different in relation to worker performance and educational achievement. And while a school leaver who does very well in the East African Certificate of Education is assured of a better paid job, to argue that well educated people will automatically boost efficiency may be to misunderstand in a fundamental way the nature of Kenyan education which functions as a licensing agency for formal sector jobs.

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11. Simmons, John. The Income Benefits from Formal And Informal Education: Estimates for a Socioeconomic Model. Economic Development Report No. 211, Centre for International Affairs, Harvard University Cambridge, Massachusetts, April 1972.



METHODOLOGY:

The problem at hand requires a casual model as a tool for analysis. Although EACE does not cause HSC, EACE is expected to identify effeciently pupils who are capable of passing Higher School Certificate Examination. A pupil's achievement in an academic test is a fused, imperfect index of a range of variables such as intelligence and school background which determine performance in a specific examination. If these factors do not change within the time period a pupil sits for the two examinations, and if these examinations measure similar skills, one expects a pupil who scores low marks in one, to score low marks in the other or vice versa.

The method to be used in this study will be to compare the performance of pupils in the 1969 School Certificate of Education with their achievement in the 1971 Higher School Certificate. This is therefore using HSC Examination as a measure of progress in higher school, and as a criterion against which to measure the efficiency of the selection examination (EACE).

The Variable System and Hypotheses

A. The Independent Variables are:

1. East African Certificate of Education: A student's E.A.C.E. performance consists of a variety of marks awarded for each individual subject taken. On each subject the marks range from 1 to 9 with 1 being the top mark possible and 8 the lowest pass mark possible while 9 is a fail. To give a single mark for the whole EACE performance I intend to add the marks of the six best subjects, including English Language which is the method used for assessing the grade of school certificate.
2. The socio-economic status (SES). SES of a pupil is expected to influence his performance in an examination considerably. This is a difficult variable to work with particularly in relation to measurement. Nonetheless this research has the advantage of making use of the socio-economic data belonging to the Secondary School Tracer Project. Some

of the available data is:

- (i) Occupation of father and mother.
- (ii) Property owned by the family in form of land, cattle and cash crops.
- (iii) The educational attainment of the parents etc.

3. The closely associated factors of school quality and school type. There are three types of secondary schools; national-catchment, local-catchment and Harambee. The differences between them are differences in educational quality<sup>12</sup>. H.C.A. Somerset found that the national catchment, local-catchment maintained and Harambee schools had mean grade aggregate of 25.90, 35.94, and 45.27 respectively in the 1969 EACE performance.

B. The Dependent Variable: is Higher School Certificate (HSC). A student HSC performance is graded in a different way from EACE. Letters A, B, C, D, and E are used as labels for various principal level passes, while O, indicate that only an ordinary level pass was achieved and F, a fail. One problem is that the number of HSC subjects taken vary between three and four subjects as well as the performance in each subject. I need a single figure to sum up HSC performance to be able to apply correlation analysis and to generalize about the effects of HSC performance. I therefore propose to attribute the following marks to each HSC grade.

HSC Grade	Number attributed
A	6
B	5
C	5
D	3
E	2
O (Subsidiary)	1
F (Fail)	0

A single figure can now be calculated to sum up a student's performance in this examination using the attributed numbers

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12. For detailed discussion of school quality and school type, see Somerset, H.C.A. Educational Aspirations of Fourth-Form Pupils in Kenya. Discussion Paper No. 117, Institute for Development Studies, University of Nairobi, 1971.

to the actual grades. The best performance would perhaps be 4As and a subsidiary in General Paper or any other subject taken at subsidiary level; with a numerical equivalence of 25 marks. This method shows that the more subjects a student took the higher the number of marks one might accumulate. This could be justified since the chance of getting a high mark on any single subject is probably reduced as the number of subjects taken increases. The method chosen works in the opposite way to the EACE marks. For EACE, the greater the number recorded the worse the performance.

Hypothesis (i)

There is a low positive correlation, between a pupil's performance in EACE and HSC.

Hypothesis (ii) The performance of a pupil in an academic achievement examination is determined to some extent by his socio-economic status.

Hypothesis (iii) Pupils from national-catchment secondary schools who enter Form 5 in the same schools, are more successful in the HSC examination than the pupils who enter a form 5 class in a local-catchment secondary school.

THE SAMPLE:

A sample of about 310 is drawn from an existing larger sample of 1969 EACE Candidates. A random number of 21 secondary schools stratified by Province was selected from a list of all secondary schools found in Kenya. Three other schools were added so as to cover as fully as possible the complete range of types of secondary schools. Two of these supplementary schools, were national-catchment low cost schools, one for boys and the other for girls. Both these schools have long-established reputation for academic excellence, and have contributed altogether disproportionately to Kenya's educated elite. The third school in the supplementary sample is an agricultural school for boys.

The unit of analysis in this study is a pupil's performance in the EACE and HSC. The attempt to sample schools,

assumes that the form four school leaver population is also fairly covered.

Changes in this selection examination before and after the year I have selected the sample can not be ruled out. Perhaps as a result of these changes the examination now identifies pupils with the potential to succeed at Higher School and also at the University, less or more effeciently than it used to. Since this study intends to investigate the predictive validity of only one selection examination which was taken in 1969, replication studies might enhance the reliability of our findings. Besides, the size of our sample is pre-determined by the number of pupils in the sampled secondary schools who were selected for sixth form education and who sat for Higher School Certificate examination. A future study of this kind might select a sample from a population of Form five entrants to avoid some of these limitations.



REFERENCES.

- Berg, Ivar, Education and Jobs: The Great Training Robbery. Bacon Press, Boston 1971.
- Dore R.P. and Jolly A.R., "Qualifications and Selection in the Educational Systems of Developing Countries: a draft programme of Research."
- Furley O.W., "Transformation in Education since Independence." East African Journal. Vol. 9 No. 8. August, 1972.
- Jones John and Johnson Richard T., "School Certificate Results as Predictors of Success at University." Education in Eastern Africa. Vol. 2 No. 2, 1971 pp. 55-62.
- King Kenneth, "Primary Schools in Kenya: Some Critical Constraints on their effectiveness." Discussion Paper No. 130, I.D.S., University of Nairobi, 1971.
- Kinyanjui, P.K. and Shepherd Donald, "Unemployment among Secondary School Leavers in Kenya." East African Journal. Vol. 9, No. 8. August 1972.
- Kinyanjui, P.K. Education, Training and Employment of Secondary School Leavers in Kenya. Discussion Paper No. 138 I.D.S. University of Nairobi, 1972.
- Kinyanjui, K. "What is Future of School Leavers?" in Target, November 23, 1973. pp. 5.
- Ministry of Education, Annual Reports 1963-1972.
- Nwanam Obi, C., "Objective Tests in East Africa" Education in Eastern Africa. Vol. 3, No. 1, pp. 46-53.
- Ryan, T.C.I. and Steward F. School Background as Predictor of First Year Economics Performance. Staff Paper No. 77, I.D.S., University of Nairobi, 1970.
- Schwarz Paul, A. and King Robert E., "Ability Testing in Developing Countries" Development Digest Vol. X, No. 4, October 1972. pp. 103-124.
- Simmons John, The Income Benefits from Formal and Informal Education: Estimates of a socio-economic Model. Economic Development Report No. 211, Centre for International Affairs. Harvard University Cambridge Massachusetts, 1972.
- Somerset, H.C.A., "Who Goes to Secondary School?: Efficiency, Equity, and Relevance in Secondary School Selection" in David Court, D.P. Ghai (eds.) Education, Society, and Development: New Perspectives from Kenya: Nairobi, the Oxford University, Press (forthcoming).

Somerset, H.C.A. Educational Aspirations of Fourth Form  
Leavers in Kenya Discussion Paper No. 117, I.D.SS.  
University of Nairobi, 1971.

Somerset, H.C.A., Educational Aspirations of Fourth Form  
Leavers in Kenya. Discussion Paper No. 117, IDS.  
University of Nairobi, 1971.

The Institute of International Education, and the Ministry  
of Education - Nairobi - Kenya. Handbook for  
Schools Guidance Counsellors: A Manual of Careers  
Reference for Secondary School Students, Kenya 1973.