Education in the Commonwealth

Education in Developing Countries of the Commonwealth

Reports of Research in Education Volume II

Commonwealth Secretariat

Education in the Commonwealth

Education in Developing Countries of the Commonwealth

Reports of Research in Education Volume II

Commonwealth Secretariat

Printed and published by
The Commonwealth Secretariat

May be purchased from
Commonwealth Secretariat Publications
Marlborough House
London SW1Y 5HX

ISBN 0 85092 131 7

CONTENTS

INTRODUCTION

This is the second in the series of publications of the Commonwealth Secretariat's effort to bring together brief reports of research findings which were made available at its request and which it is hoped would be of interest to governments and research personnel.

Due to various reasons this publication has been considerably delayed. In view of the need for economy and also the fact that whereas nine years ago sources for the type of information exchange envisaged when the series was initiated were very few, documentation services nationally and internationally have advanced sufficiently to meet the requirements of research personnel and educationists. It has therefore been decided that for some time, at least, the present series will conclude with this volume.

The Education Division of the Commonwealth Secretariat wishes to thank the research workers who have made the earlier publications, as well as this one possible by submitting reports on their work. With the increasing facilities now available for information exchange it is decided that this would be the last issue in the series of research abstracts and summaries.

FACTORS RELATED TO THE PERFORMANCE OF THIRD YEAR STUDENTS IN MATHEMATICS IN JAMAICAN POST PRIMARY SCHOOLS

Ian Isaacs, University of the West Indies

Studies done on the academic achievement (Reid, 1964) and the cognitive abilities (Vernon, 1969) of primary school children in Jamaica have suggested that environmental factors greatly affect the academic performance of these children. Mathematics is usually regarded as the school subject which is least affected by social and cultural factors. The writer decided to investigate which of the following variables had the greatest effect on the mathematical performance of secondary school students: psychological variables (affective and cognitive); environmental variables (location, size, and type of school); teacher related variables (experience, qualification, sex, and effectiveness); and other pupil related variables (sex, socio-economic status, and teacher rated performance in mathematics).

THE SAMPLE

A stratified random sample of 457 pupils in their third year of secondary schooling in 16 post primary Jamaican schools was selected from all streams in 7 All-Age Schools, 4 Junior Secondary Schools, 2 Private Secondary Schools, and 3 government aided High Schools. Questionnaires were also administered to the 33 teachers of these pupils to gather data on relevant teacher attributes. The teachers were rated for their effectiveness by their principals, or an education officer if the principal also taught mathematics at the grade nine level.

THE INSTRUMENTS

The criterion, Mathematics Achievement ("Math. Achv."), was measured by a 70 item test designed by the writer which is similar to the Grade Nine Achievement Test in Mathematics (1970), Ministry of Education, Kingston (Isaacs, 1971). The following variables were examined to see if they are related to mathematics achievement:

English Language Achievement ("Eng. Achv."), measured by a modified form of the Ministry of Education's Grade Nine Achievement Test in English (1970);

Verbal Mental Ability ("Verb. M.A."), measured by L.H.E. Reid's Mental Ability Test 11-J6, Part I;

Non-Verbal Mental Ability ("N-V M.A."), measured by L.H.E. Reid's Mental Ability Test 11-J6, Part II;

Self-Concept of Mathematical Ability, ("S-C"), measured by a modified form of the Brookover (1965) Self-Concept of Ability - Specific Subjects (Form B) scale;

Attitudes to Mathematics ("Att."), measured by an instrument based on items from the three attitude scales used in the International Study of Achievement in Mathematics (Husen, 1967);

Socio-Economic Status ("SES"), measured by a rating scale based on Miller's (1967) Occupational Coding Scheme;

Teacher Assigned School Marks/Grades ("Grade") were obtained from the school records;

Teacher Qualification ("Tch. Qual."), Teacher Experience ("Tch. Exp.") and Teacher Sex were determined from the teachers' responses on a questionnaire;

Teacher Effectiveness ("Tch. Eff."), measured by a rating scale based on Ryan's (Remmers, 1963) Assessment Blank;

School Size ("Sch. Size") and School Type ("Sch. Typ.") were determined from the Ministry of Education's Directory of Government and Government-Aided Educational Institutions, 1967-1968;

Importance of School Location ("Sch. Loc.") was rated on a scale based on Levert's (1968) Inventory and Classification of Urban Settlements in Jamaica.

ANALYSIS OF THE DATA

A number of hypotheses were formulated and tested and the following inferences drawn:

That Mathematics Achievement is significantly related (at the .01 level) to:

a) English Language Achievement (r = .786);
b) Verbal Mental Ability (r = .801);
c) Non-Verbal Mental Ability (r = .630);
d) Self-Concept of Mathematical Ability (r = .360);
e) Attitudes to Mathematics (r = .240);
f) Teacher Assigned School Grades/Marks (r = .625);
g) Teacher Experience (r = .321);
h) Teacher Effectiveness (r = .331);
i) Importance of School Location (r = .438);

that, for this population, there is:

j) no significant relationship between teacher qualification and mathematics achievement;
k) no significant difference between the mathematical performance of subjects taught by men and those taught by women;
l) no significant difference between the mathematical performance of boys and girls;
m) a significant difference between the mathematical performance of subjects in the upper and lower social classes.

A 14 x 14 correlation matrix for the 13 independent variables and mathematics achievement was prepared by calculating the product moment correlations between each pair of variables (see Table 1). This matrix was factor analysed to produce a preliminary components solution of 9 components which accounted for 91% of the variance in the mathematics achievement test. The first four components all had eigen values greater than one (and accounted for 67% of the variance) while the remaining 5 components had eigen values less than one. An examination of the components by the writer showed that the first four components were easily interpreted in terms of the variables whilst the remaining components could not be so easily interpreted because of the very low loadings of the variables on them. The writer therefore decided to limit the principal factor solution to four factors.

TABLE 1: CORRELATION MATRIX OF FOURTEEN ENVIRONMENTAL AND PSYCHOLOGICAL VARIABLES*

	Eng. Achv.	Verb. M.A.	N-V. M.A.	S-C.	Att.	SES	Grade	Tch. Qual.	Tch. Exp.	Tch. Eff.	Sch. Typ.	Sch. Size	Sch. Loc.
Math. Achv.	7753	7747	5285	3037	2397	-3998	6252	1035	3212	3313	3867	2615	4379
Eng. Achv.		7930	4996	1536	1725	-3746	4423	1311	3180	4328	4131	1863	4344
Verb. M.A.			5979	1687	1624	-4556	4439	1201	1988	2991	4403	2605	4413
N-V M.A.				1631	2126	-2614	3551	0666	1283	2594	2064	3850	4402
S-C					5022	0333	4039	-1226	-0003	-0010	0184	-0250	-0399
Att.						0821	2669	-0303	-0092	0485	0222	0218	0691
SES							-1769	-1948	-1337	-0848	-5408	-1891	-4312
Grade								-0377	1926	2043	0944	0805	1890
Tch. Qual.									-0853	-1173	2791	-0938	1075
Tch. Exp.										2659	-0224	0528	3242
Tch. Eff.											0168	3787	4326
Sch. Typ.												-2649	3912
Sch. Size													5516

* Decimal Points omitted

The correlation matrix was used to produce a principal axes factor solution. The principal factor pattern for the first four factors is shown in Table 2. This factor matrix shows the usual principal axes pattern of a first factor which is a general factor followed by secondary bipolar factors. No attempt was made to interpret it. This pattern was used to produce a rotated factor solution by the Varimax method. The rotated factor pattern is shown in Table 3.

TABLE 2: MATRIX OF (UNROTATED) FACTOR LOADINGS FOR FOURTEEN PSYCHOLOGICAL AND ENVIRONMENTAL VARIABLES*

Variables	Factors			
	A	B	C	D
Math. Achv.	8828	1158	-1316	1143
Eng. Achv.	8494	-0288	-0784	1785
Verb. M.A.	8608	-0576	-1217	-0116
N-V M.A.	6928	-0859	0914	-3107
S-C	2589	6916	-3638	-1045
Att.	2606	6139	-2782	-2814
SES	-5504	4943	1444	0577
Grade	5889	4298	-1857	1710
Tch. Qual.	1276	-4623	-3698	-2699
Tch. Exp.	3608	0310	2837	6931
Tch. Eff.	4847	0780	5283	1451
Sch. Typ.	4749	-4984	-5291	0300
Sch. Size	3941	0504	7046	-4740
Sch. Loc.	6801	-2737	3558	-1606
Variance	33.8%	13.3%	12.2%	7.8%

* Decimal points omitted

TABLE 3: MATRIX OF ROTATED FACTOR LOADINGS FOR FOURTEEN PSYCHOLOGICAL AND ENVIRONMENTAL VARIABLES*

Variables	Factors				
	I	II	III	IV	h^2
Math. Achv.	5224	4864	3133	4642	823
Eng. Achv.	5574	3245	3031	5025	760
Ver. M.A.	6178	3589	3729	3313	759
N-V M.A.	3411	3682	5784	0766	593
S-C	-0654	8239	-0748	0032	689
Att.	-0491	7592	0737	-1315	602
SES	-7089	0948	-2229	-1012	571
Grade	1796	6270	0897	4022	595
Tch. Qual.	5664	-1089	-0512	-3230	440
Tch. Exp.	0024	-0727	0445	8275	692
Tch. Eff.	-0383	0110	5487	4884	541
Sch. Type	8584	0171	-1271	0380	755
Sch. Size	-1229	-0102	9288	-0324	879
Sch. Loc.	4029	-0594	6863	2303	690

*Decimal points omitted

DISCUSSION

Following guidelines laid down by Thurstone (1938) for determining the significant factor loadings, the writer considered only those variables which have loadings of .40 or higher on the factor. The first factor of the rotated factor pattern was loaded mainly on School Type and Social Class. (The negative sign for Social Class arose as a result of the inverse order in coding social class: 1 for the highest, 6 for the lowest.) The factor was loaded to a lesser extent on Teacher Qualification, and the variables measuring academic achievement and ability, as well as School Location. This factor was designated the "Social Environment of the School and Home". It accounted for approximately 27% of the variation in performance of the students on the mathematics achievement test.

The factor seems to represent that syndrome of social and cultural factors which affects motivational levels, learning styles, attitudes to learning and hence level of academic performance. This factor is partly

determined by the tone and climate of the school and the home. As the more highly qualified teachers tend to be found in, and gravitate to, the schools with higher social status it is not surprising to find that Teacher Qualification has a significant loading on this first factor.

The second factor was loaded mainly on the affective variables related to mathematics achievement and school grades in mathematics. This factor was designated "Perception of Mathematics and Mathematical Ability". It accounted for about 24% of the variation in mathematical performance on the achievement test. The second factor probably includes those personality characteristics of the subjects which determine attitudes, interest, self-confidence, as well as those subjective perceptions of mathematics, the teachers of mathematics, and the doing of mathematics which make up the emotive component of learning school mathematics.

The third factor was loaded mainly on School Size and Location. This factor was designated the "School and its Environs". It accounted for a further 10% in the variation of the mathematical performance of the students. This factor is best described in terms of the physical attributes of the school as well as the demographic features of, and the civic and social importance of the community in which the school is located. Factor III shows a significant loading on the non-verbal mental ability test. This suggests that non-verbal mental ability is probably stimulated by physically and socially more complex surroundings and so students living in such surroundings tend to perform better than those from simpler (i.e. more rural) communities.

The fourth factor was loaded on "Teacher Experience" and "Effectiveness". It was designated the "Teacher". This factor accounted for approximately 21.5% of the variation in the mathematical performance of the students. It is interesting to note that "Teacher Qualification" was negatively loaded on this factor. This probably occurred because for this sample the most experienced and effective teachers were mainly those trained in teachers' colleges. The majority of the graduates in this sample were relatively inexperienced and not rated as highly, by their principals, as the older and less qualified teachers. The significant loading of English Achievement on this factor probably arose from the fact that in the All-Age schools in this sample the teachers of mathematics were also the teachers of English. This was also the case in some classes in the Junior Secondary Schools.

Three of the factors identified in this survey (Factors I, III, & IV) are environmental or situational type factors. Which leads one to conclude that these extrinsic factors tend to mask the variation in mathematics achievement which are due to the developed cognitive abilities of the students. The findings of this exploratory study lead one to suggest that research into the academic aptitude and ability of Jamaican children must carefully control for variation in environmental and social factors.

REFERENCES

1. Brookover, W.B., Patterson, A., and Thomas, S., Improving Academic Achievement through Students Self-Concept Enhancement, Co-operative Research Services, East Lansing, Michigan State University, 1965.

2. Isaacs, I., "The Grade Nine Achievement Test in Mathematics, June 1970", M2A, The Magazine of the Mathematical Association, Kingston, No. IV, 1971, pp. 42-29.

3. Husen, T., International Study of Achievement in Mathematics (Vol. II), John Wiley, 1967.

4. Levert, P.O., Inventory and Classification of Urban Settlements in Jamaica (Vol. II), Mimeographed monograph, Town Planning Department, Ministry of Finance & Planning, Kingston, 1968.

5. Miller, E.G., "A Study of Body Image, Its Relationship to Self-Concept, Anxiety and Certain Social and Physical Variables in a Selected Group of Jamaican Adolescents", Unpub. M.A. thesis, Department of Education, U.W.I., Mona, 1967.

6. Reid, L.H.E., "The Effects of Family Pattern, Length of Schooling and Other Environmental Factors on English and Basic Arithmetic Attainment of Jamaican Primary School Children", Unpub. Ph.D. thesis, University of London, 1964.

7. Remmers, H.H., "Rating Methods in Research on Teaching" in GAGE N.L. (ed.) Handbook of Research on Teaching, Rand McNally & Co., 1963, pp. 329-378.

8. Vernon, P.E., Intelligence and Cultural Environment, Methuen, 1969.

PREDICTION OF ACHIEVEMENT IN SCIENCE ON THE BASIS OF THE SCIENTIFIC CREATIVITY TEST SERIES

S.K. Majumdar

National Institute of Education,
National Council of Educational Research and Training, New Delhi

Even before the Delhi Higher Secondary (Science) Examination (1974) results and the National Science Talent Search Test (1974) results were out (the interview for the latter was still being held) a prediction for achievement in Science of a group of students appearing in these was made on 1st June, 1974 and submitted to the Head of the Department of Education in Science and Mathematics, National Council for Educational Research and Training (NCERT) by this author - based on the technique of topographical analysis of the scatterplot between the distribution of the newly developed Scientific Creativity Test scores and IQ of these subjects. The predictions came out to be highly significant. The study is detailed below:

PURPOSE OF THE STUDY

The study was undertaken to test, a priori, the predictive validity of the newly-constructed Scientific Creativity Test series that was being developed under the Department of Science Education (renamed, Department of Education in Science and Mathematics), NCERT for the purpose of utilization by the National Science Talent Search Scheme (now renamed National Talent Search Unit). The other purpose was to verify the validity of some basic postulates related to this study.

PROCEDURE

Tools The test-series utilized here consisted of Scientific Creativity Test - Parts I and II, containing 29 SI-factor subtests. These subtests were constructed keeping the psychometric construct of the concerned SI-factor intact and introducing contents from the areas of science, namely, - Physics, Chemistry, Biology and Mathematics. The test construct was detailed in a Monograph published by the NCERT (Majumdar 1973) and was presented in a paper read before the Nagpur session of the Indian Science Congress in 1974 (Majumdar 1974).

The other tests included in the test-series were an IQ-Test (Cattells' Culture Fair Test of pure "g", Scale 3, Forms A and B) and a Personality Test for Extraversion and Neuroticism (Maudsley Personality Inventory by Eysenck).

Population For the purpose of this study, the abovementioned test-series was administered to a group of 60 class XI Higher Secondary science students of

Lady Irwin Girls' Higher Secondary School, New Delhi, in July-August, 1973. The reason for choosing this school was that it had obtained the largest number of NSTS scholarships amongst all the schools in India during the last few years.

Criteria Two criteria came in handy for predictive validation - (1) The Delhi Higher Secondary (Science) Examination, 1974, and (2) National Science Talent Search Test, 1974. While all the subjects appeared in the former only about twenty appeared in the latter. Thus, the Higher Secondary (Science) Examination (1974) scores appeared to be a more suitable criterion for the purpose of determining the predictive validity.

IQ-Creativity Postulates The hypotheses for the prediction were based on the following postulates:

(1) The study of IQ-Creativity (DP) score relationship by Guilford (1967) and a replication of the same by this author (Majumdar, 1970) both showed a typical triangular scatterplot - indicating, in the words of Guilford that "although high IQ is not a sufficient condition for high DP ability, it is almost a necessary condition."

(2) The Gatzels-Jackson study (1962) that in spite of 23 points difference in mean IQ between the "High Creative (with low IQ)" the "High IQ (with low creativity)" groups were found to be equally superior in achievement scores.

(3) Anderson's (1960) Threshold Concept that beyond a cut-off point in IQ, it is Creativity that is more responsible for achievement.

Topographical Rank-Ordering for Prediction

On the basis of the three postulates above a synthetic approach had been made in putting forward the prediction hypotheses through the analysis of the scatterplot between Scientific Creativity (SC) Test scores and IQ. A topographical rank-ordering of the subjects based on the positions of the individuals on the said scatterplot, as well as the quadrant-wise analysis of the groups formed by the intersection of the mean lines of the two distributions, were taken recourse to.

The performance of the individuals being dependent on both SC score and IQ variables in manners described in postulates noted above, the best way considered to rank the individuals on the combined (IQ+SC)-score was to scan the scatterplot from top-right to bottom-left by a sliding tangent-form (slope form) making an angle θ with the X-axis inclined towards left of the diagram (Fig. 1), where $\theta = \tan^{-1} \frac{\text{Range of SC scores}}{\text{Range of IQ}}$.

The underlying assumption, here, being that when both the distributions are normal, for a particular position of the tangent-form, all points on it will have the same combined (IQ+SC)-score. Even if the distributions are not both normal or have a somewhat curvilinear relationship this fact will remain more or less true. As the tangent-form is moved from right to left, the combined score at any position on it gets gradually reduced, and every individual's position as it comes upon the line, can be noted down in sequential rank.

Prediction Hypotheses based on IQ-SC Ranking

Hypothesis I: For the whole population, the IQ+SC topographical rank ordering will predict the outcome of any test of achievement in science and mathematics.

Hypothesis II: Similar rank orders for the quadrant-groups will predict similar outcomes of achievements within these groups.

The predictive validity for IQ and SC-scores, separately, in relation to achievements in HS (and NSTS) would also be found out.

The various quadrant-wise analysis of the groups formed by the intersection of the mean lines of the IQ and SC distributions in the scatterplot would also help verification of the postulates.

Personalistic postulates

(a) According to Cattell (1963), Golovin (1963) and various other authorities on the subject, extraverts are not likely to be Creative Scientists, or good achievers in science.

(b) Terman (1930, 1947) and Anne Roe (1953) found the talented and Creative Scientists to be stable and well-adjusted. According to both (Terman, 1947 and Roe, 1963) neurotic tendency is contrary to Creative Personality.

The above two postulates were to be verified in the light of the findings and valid conclusions drawn (Majumdar 1973, pages 15 to 19).

FINDINGS

The means and standard deviations of the various test-score distributions for the whole population are as follows:

	SC Test Scores	IQ	Neuro-ticism	Extra-version	HS Sc. marks	HS Total marks	NSTS (only awardees)
Mean	82.27	95.63	25.60	26.57	397.83	515.12	136.6
SD	21.10	13.50	7.65	7.45			

The detailed scores are to be found in Table 1.

The product-moment Correlations between the variables for the whole population (N=60) are as follows:

	IQ	HS Sc. marks	Neuroticism	Extra-version
SC Test Scores	** .54	** .60	** 0.52	0.03
IQ		** .53	+ 0.29	**0.57
HS Science marks			* 0.38	0.05

\+ Significant at .05 level
* Significant at .01 level
** Significant at .001 level

Re: Higher Secondary Examination in Science

It was found that the top 11 positions in the Higher Secondary (Science) Examination were obtained by the High SC - High IQ group (Quadrant I of the scatterplot).

Of the subsequent six positions (12th to 17th) two were obtained by the above group and the rest (four) by the High SC - Low IQ group (Quadrant II).

Thus all the top 17 positions go to the High SC - groups (Quadrants I and II). But none of these top positions go to the High IQ - Low SC group. (Fig. 1 indicates these.)

The means of the different test scores, and the number of NSTS awards for the four Quadrants are as follows:

	Population	SC Score Means	IQ Means	Neuroticism Means	Extra-version Means	HS Total Means	HS Sc. marks Means	NSTS No. of awards
Quadrant I (High SC - High IQ)	20	103.13	108.25	21.10	25.70	581.05	454.15 (13 top positions)	8
Quadrant II (High SC - Low IQ)	9	91.75	88.00	26.22	28.00	514.78	395.89 (4 top positions)	3
Quadrant IV (High IQ - Low SC)	9	68.31	106.11	28.89	26.11	498.78	390.45 (Nil)	Nil
Quadrant III (Low IQ - Low SC)	22	65.15	83.00	28.09	26.95	462.00	350.45 (Nil)	Nil
Total Population	60	82.27	95.63	25.06	26.57	515.12	397.83	11

Rank-Difference Correlations:

The rank-difference correlations between the marks of HS Science subjects and the topographical rankings based on IQ-SC Composite (Table - 2) is 0.61, significant at 0.001 level.

The rank-difference correlations within groups are as follows:

HIGH SC - HIGH IQ GROUP (N=20)
(QUADRANT I)

Between SC and HS Science marks	0.66 Significant at 0.001 level
Between (IQ+SC) and HS Science marks	0.65 Significant at 0.01 level
Between IQ and HS Science marks	0.36 Not Significant at 0.05 level

HIGH CREATIVE GROUPS (N=29)
(QUADRANTS I & II)

Between SC & HS Sc. marks	0.61 Significant at 0.001 level
Between IQ & HS Sc. marks	0.51 Significant at 0.01 level

HIGH IQ GROUPS (N=29)
(QUADRANTS I & IV)

Between SC & HS Sc. marks	0.52 Significant at 0.01 level
Between IQ & HS Sc. marks	0.16 Not Significant

Re: National Science Talent Scheme Test Results:

Of the 11 NSTS awards obtained by this population, the High SC-High IQ group secured 8 awards, and the High SC-Low IQ groups obtained 3. The other groups obtained none.

Within the NSTS group (N=11) the rank-difference correlations were as below:

Between SC & HS Sc. marks	0.77 Significant at 0.01 level
Between (IQ & SC) & HS Sc. marks	0.70 Significant at 0.01 level
Between IQ & HS Sc. marks	0.60 Significant at 0.05 level

But the rank-difference correlations between NSTS test scores and all the other test scores were not significant:

Between NSTS & SC	0.16 Not Significant
Between NSTS & (IQ+SC)	0.18 Not Significant
Between NSTS & IQ	0.25 Not Significant
Between NSTS HS Sc. marks	0.36 Not Significant

DISCUSSION

The first hypothesis regarding the prediction of Achievement in science for the whole population on the basis of topographically-determined rank-order (IQ+SC) was found to be valid in respect of Higher Secondary Science marks. The Predictive Validity of 0.61 is highly significant (at 0.001 level) and is highest when compared to that of IQ or SC alone.

The second hypothesis regarding topographically-determined rank-orders within groups as predictors, is valid only in the case of High SC-High IQ group, the Predictive Validity being 0.65, which is significant at 0.01 level. In other Quadrant groups, however, the correlations were not significant (within the NSTS group its correlation with HS Sc. subjects is 0.70, which is significant at 0.01 level).

Predictive Validity of SC Test

The SC test scores were equally good, or in a way even better predictor of Higher Secondary Science marks. While for the whole group the Predictive Validity is 0.06 significant at 0.001 level, for the High Creative (Quadrants I and II) is 0.61 at the same significant level. Again while the Predictive Validity for High IQ groups (Quadrants I and IV) is 0.52, that for the High SC-High IQ group is 0.66 (both significant at the 0.001 level) and that for the NSTS group is 0.77 (significant at 0.01 level). For the other Quadrants, the correlations were not significant.

Predictive Validity of IQ Test

IQ had a low Predictive Validity in the whole population as a whole and had no significant Predictive Validity in any of the Quadrants taken separately or even in Quadrants I and IV taken together. However, it had a Predictive Validity of 0.50 significant at 0.01 level in the High Creative groups, Quadrants I and II taken as a whole.

Predictive Validity of NSTS Tests

The NSTS tests, had no significant Predictive Validity with respect to SC, (IQ+SC) or IQ scores, considered here. No valid conclusion could be drawn from this since the sample under consideration was unfortunately very small. Nevertheless all NSTS awardees were amongst the top HS achievers, and all were High Creatives at the same time.

The performance of the Quadrant-wise groups have some special characteristics. As expected, the High SC-High IQ (Quadrant I) group has definitely performed very well, acquiring 13 out of the top 17 positions, in HS Exam., and 8 out of the 11 NSTS awards. To our utter surprise, however, the High SC-Low IQ group (Quadrant II) comes next in performance acquiring the balance of top HS positions and NSTS awards. While the High IQ-Low SC group (Quadrant IV) gets none, even though the former group has a mean IQ of 88 and the latter a mean IQ of 106.

Regarding the postulates that were verified in this study, the following points are noteworthy:

(1) We obtained a triangular-type scatterplot between IQ and SC scores as expected.

(2) The Getzels-Jackson cut-off points were higher. Thus the fact that achievements of High SC-Low IQ group is superior to that of the High IQ-Low SC group suggests that the Getzels-Jackson postulate needs modification that both groups are equally superior in Achievement. (Getzels-Jackson cut-off points were higher.)

(3) The Anderson Threshold Concept that beyond a cut-off point of IQ, it is Creativity that is responsible for achievement remains perfectly applicable in our study as amongst the High Creatives groups (Quadrants I and IV) SC score has a Predictive Validity of 0.52 for achievement in science subjects whereas IQ has (0.16) a no significant predictive validity.

Personality of High Achievers and Creatives

Regarding the relationships with the personality variables, Extroversion and Neuroticism; we should note the following:

Neuroticism has high negative correlations with SC scores and HS (Sc) scores, being 0.52 and 0.38, significant at both 0.001 and 0.01 levels. With IQ, the correlation is 0.29 which is significant at 0.05 level.

Extroversion has very low negative correlations with SC scores and HS (Sc) scores, being 0.03 and 0.05 respectively. Whereas it has a high negative correlation with IQ (0.57), which is significant at 0.001 level.

We can say then that the High Creatives and High Achievers in the field of science are generally stable and not extroverts.

Conclusion

The Scientific Creativity Test is a very good predictor of Scientific Achievements. High SC score generally, and High SC+High IQ particularly, go with talent in the field of Science. The talented in the field of Science (High Creatives and High Achievers) are also generally highly stable (very low in Neuroticism) and not extroverts (rather low in Extroversion).

As the three variables: SC Test Scores, IQ and Neuroticism were all found to be very good predictors of Scientific Achievement, it will be worthwhile to find out the multiple correlations and multiple regression equations based on these variables for prediction of achievement or performance in the field of Science.

Fig. 1 - IQ-SC scatterplot (indicating performance in NSTS and HS Sc. examinations).

Table 1 - Score Table for the whole population (Lady Irwin HS School, Class XI Sc. 1973-74).

Table 2 - IQ-SC Composite Rank-Order of the whole population (Lady Irwin HS School, Class XI Sc. 1973-74).

Table 3 - Score Table for Quadrant I

Table 4 - Score Table for Quadrant II

Table 5 - Score Table for Quadrant IV

Table 6 - Score Table for Quadrant III

REFERENCES

1. Anderson, J.E. "The Nature of Abilities" in"Talent and Education" (Torrance, Ed.) University of Minn., 1960.

2. Cattell, R.B. "The Personality and Motivation of the Researcher from Measurement of Contemporaries and from Biography" in "Scientific Creativity" (Taylor & Barron, Ed.) New York: Wiley, 1963.

3. Getzels, J.W. & Jackson, P.W. "Creativity and Intelligence, Explorations with Gifted Students", New York: Wiley & Sons, 1962.

4. Golovin, N.E. "The Creative Person in Science", "Scientific Creativity" (Taylor & Barron, Ed.) New York: Wiley, 1963.

5. Guilford, J.P. "The Nature of Human Intelligence", McGraw-Hill, 1967.

6. Majumdar, S.K. "A Study of Divergent Thinking in B.Ed. students in Relation to their Intelligence, Sex, Academic Achievement and some Basic Dimension of Personality" - Papers read in Ph.D. Colloquium, Central Institute of Education, Delhi University, August & September, 1970.

7. Majumdar, S.K. "Scientific Creativity: a research project under National Science Talent Search Scheme" Monograph, NCERT, November, 1973.

8. Majumdar, S.K. "Identification of Scientific Creativity: A Psycho-pedagogical Construct" Paper read before the Indian Science Congress, Nagpur, January, 1974.

9. Roe Anne "A Psychological Study of Eminent Psychologists and Anthropologists and a Comparison with Biological and Physical Scientists": Psychological Monograph, LXVII, No. 2, 1953.

10. Roe Anne "Personal Problems in Science" in"Scientific Creativity" (Taylor & Barron, Ed.) New York: Wiley, 1963.

11. Terman, L.M. "Genetic Studies of Genius" Vol. I, 1925; Vol. III, 1930; Vol. IV, 1947; Stanford University Press.

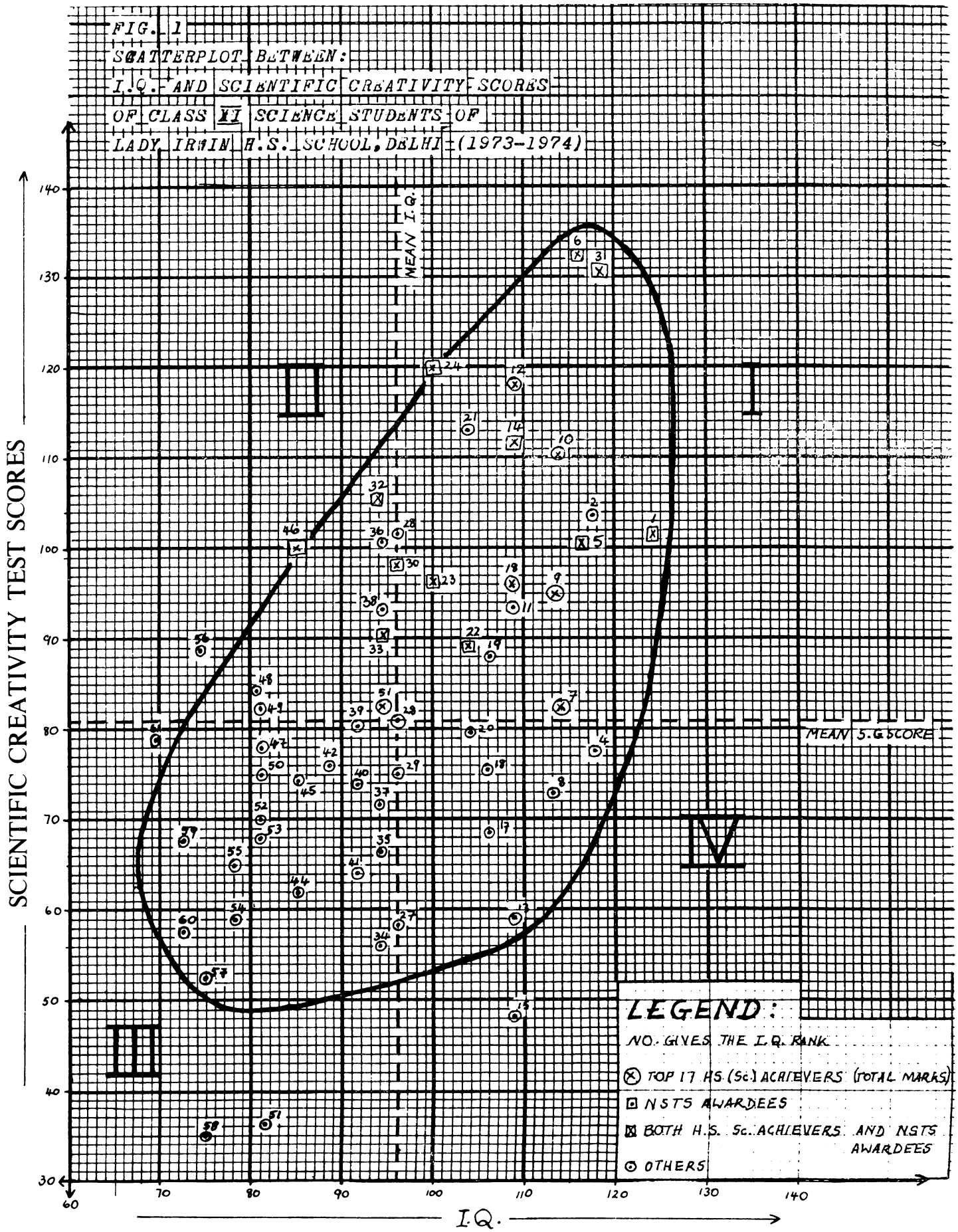


FIG. 1
SCATTERPLOT BETWEEN:
I.Q. AND SCIENTIFIC CREATIVITY SCORES
OF CLASS XI SCIENCE STUDENTS OF
LADY IRWIN H.S. SCHOOL, DELHI (1973-1974)
SCIENTIFIC CREATIVITY TEST SCORES
I.Q.
MEAN I.Q.
MEAN S.C. SCORE
II
I
III
IV
LEGEND:
NO. GIVES THE I.Q. RANK
⊗ TOP 17 H.S. (Sc.) ACHIEVERS (TOTAL MARKS)
⊡ NSTS AWARDEES
⊠ BOTH H.S. Sc. ACHIEVERS AND NSTS AWARDEES
⊙ OTHERS
140
130
120
110
100
90
80
70
60
50
40
30
60
70
80
90
100
110
120
130
140

Table 2

Rank order of the whole population of class XI science students (Sec. A and B, Lady Irwin Girls School) topographically located in the scatterplot between IQ and Scientific Creativity Test Scores

Rank order	Serial No. in order of IQ	Rank order	Serial No. in order of IQ
1.	(3)	31	(46)
2.	(6)	32	(31)
3.	(1)	33	(29)
4.	(2)	34	(15)
5.	(12)	35	(39)
6.	(10)	36	(37)
7.	(5)	37	(40)
8.	(14)	38	(35)
9.	(9)	39	(42)
10.	(24)	40	(27)
11.	(21)	41	(41)
12.	(16)	42	(48)
13.	(4)	43	(43)
14.	(11)	44	(49)
15.	(7)	45	(45)
16.	(8)	46	(34)
17.	(19)	47	(47)
18.	(23)	48	(56)
19.	(22)	49	(50)
20.	(32)	50	(52)
21.	(26)	51	(44)
22.	(30)	52	(53)
23.	(36)	53	(55)
24.	(18)	54	(61)
25.	(20)	55	(54)
26.	(17)	56	(59)
27.	(38)	57	(57)
28.	(22)	58	(60)
29.	(13)	59	(51)
30.	(28)	60	(58)

Table - 1

Test Results of Class XI (1973-74) Science Students of Lady Irwin Higher Secondary School, New Delhi

Serial No. (IQ Rank)	SC Test score (Parts I & II)	IQ (Culture Fair)	MPI		Higher Secondary Examination Marks					Total	Science subjects	NSTS Scores
			Extra-version	Neuro-ticism	English	Physics	Chem.	Biology	Maths			
1.	101.75	124	32	21	144	135	123	121	139	662	518	140
2.	102.75	117	28	24	100	116	114	93	123	546	446	
3.	132.25	117	9	10	164	130	132	134	135	695	531	158
4.	77.75	117	28	24	110	101	95	98	115	519	409	
5.	100.50	116	16	28	127	124	118	127	128	624	497	141
6.	132.50	116	39	7	131	125	123	118	139	636	505	130
7.	82.75	113	32	24	123	124	114	120	121	602	479	
8.	73.75	113	32	28	95	71	81	96	78	421	326	
9.	94.50	113	10	19	136	116	129	128	140	649	513	
10.	110.25	113	36	21	145	127	126	112	140	650	505	
11.	93.25	109	18	24	106	49	60	81	33	329	223	
12.	118.25	109	7	17	137	129	123	120	124	633	496	
13.	59.00	109	31	29	114	90	103	105	114	526	412	
14.	112.00	109	30	20	125	119	134	126	126	630	505	131
15.	48.25	109	22	30	107	87	89	94	104	481	374	
16.	96.00	109	36	36	125	125	121	113	130	614	489	
17.	68.00	106	22	38	122	82	89	101	104	498	376	
18.	75.25	106	32	32	117	121	103	93	106	540	423	
19.	87.25	106	30	23	107	778	93	101	69	448	341	
20.	80.00	103	24	24	91	107	105	96	124	523	423	
21.	113.50	103	38	10	115	89	102	104	119	529	341	
22.	89.00	103	33	30	122	76	85	79	83	455	432	
23.	95.75	100	20	20	119	110	122	118	134	603	414	
24.	119.50	100	20	17	145	145	123	124	140	677	333	
*25.	-	100	-	-	115	87	92	97	74	465	484	139
26.	101.25	100	21	17	138	112	91	89	107	537	532	140
27.	58.00	96	21	24	109	92	95	107	117	520	411	
28.	81.00	96	31	29	105	75	89	105	106	480	375	
29.	74.75	96	23	31	110	78	95	83	95	461	351	
30.	98.50	96	33	25	124	119	137	123	137	622	498	132
31.	81.25	94	36	36	106	129	111	122	122	590	484	

* Not considered for computations.

Table - 1 (Continued)

Serial No. (IQ Rank)	SC Test score (Parts I & II)	IQ (Culture Fair)	MPI		Higher Secondary Examination Marks					Total	Science subjects	NSTS Scores
			Extra-version	Neuro-ticism	English	Physics	Chem.	Biology	Maths			
32.	106.00	94	29	21	131	108	115	125	109	588	457	114
33.	90.25	94	32	21	124	109	99	99	127	588	434	
34.	55.75	94	24	29	104	68	67	80	100	419	315	
35.	66.75	94	29	36	116	92	105	103	92	508	392	
36.	101.25	94	25	17	116	83	100	117	118	534	418	
37.	70.75	94	27	21	103	67	82	83	81	416	313	
38.	91.75	94	27	33	127	59	82	91	72	431	303	
39.	80.50	91	32	36	103	81	82	99	84	449	346	
40.	74.00	91	32	17	108	99	119	106	125	557	449	
41.	64.50	91	30	28	142	83	81	80	79	465	323	
42.	75.00	88	24	23	118	86	94	104	88	490	372	
43.	69.75	88	25	39	130	86	94	95	80	485	355	
44.	62.25	85	24	20	116	80	104	90	100	490	374	
45.	74.50	85	20	32	95	71	77	81	75	399	304	
46.	100.25	85	20	25	123	115	124	106	141	609	486	146
47.	77.50	81	34	18	114	70	75	92	63	414	300	
48.	84.00	81	33	32	116	64	73	94	64	411	295	
49.	82.00	81	22	18	114	63	81	90	101	439	325	
50.	75.50	81	26	17	115	70	74	92	76	427	312	
51.	35.50	81	26	30	108	108	101	83	96	496	388	
52.	70.00	81	35	38	118	107	106	100	118	549	431	
53.	67.00	81	26	37	108	103	99	97	100	507	399	
54.	59.25	78	23	30	103	91	92	82	90	458	350	
55.	65.75	78	18	18	99	104	101	101	139	544	445	
56.	89.00	75	28	33	112	74	94	112	81	473	361	
57.	52.00	75	38	24	114	74	103	84	91	466	352	
58.	34.75	75	17	32	93	39	37	50	68	287	194	
59.	66.25	72	24	24	130	77	84	95	81	467	337	
60.	56.25	72	25	26	119	86	93	90	103	491	372	
61.	79.75	70	34	43	93	59	96	75	57	380	287	

Table - 3

Quadrant I

(High IQ and High SC)

Quadrant Rank Order	IQ scores	Neuro-ticism	Extra-version	SC scores	HS Total	HS Science subjects	NSTS scores
1.*+	117	10	9	132.25	695	531	158
2.*+	116	7	39	132.50	636	505	130
3.*+	124	21	32	101.75	662	518	140
4.+	109	17	7	118.25	633	496	
5.+	113	21	36	110.25	650	505	
6.	117	24	23	102.75	546	446	
7.*+	116	28	16	100.50	624	497	141
8.*+	109	20	30	112.00	630	505	131
9.+	113	19	10	94.50	649	513	
10.*+	100	17	20	119.50	677	532	140
11.	103	10	38	113.50	529	414	
12.+	109	36	36	96.00	614	489	
13.	109	24	18	93.25	329	223	
14.+	113	24	32	82.75	602	479	
15.	106	23	30	87.25	448	341	
16.*+	100	20	20	95.75	603	484	139
17.	103	30	33	89.00	455	333	
18.	96	17	21	101.25	537	399	
19.*+	96	25	33	98.50	622	498	132
20.	96	29	31	81.00	480	375	
Means	108.25	21.10	25.70	103.13	581.05	454.15	

* NSTS awardee
\+ Top 17 HS (Sc.) Achiever

Table - 4

Quadrant II

(High SC and Low IQ)

Quadrant Rank Order	IQ scores	Neuro-ticism	Extra-version	SC scores	HS Total	HS Science subjects	NSTS scores
1.*+	94	21	29	106.00	588	457	134
2.	94	17	25	101.25	534	418	
3.	94	33	27	91.75	431	303	
4.*+	94	21	32	90.25	558	434	114
5.*+	85	25	20	100.25	609	486	146
6.+	94	36	36	81.25	590	484	
7.	81	32	33	84.00	411	295	
8.	81	18	22	82.00	439	325	
9.	75	33	28	89.00	473	361	
Means	88.00	26.22	28.00	91.75	514.78	395.89	

* NSTS awardee
\+ Top 17 HS (Sc.) Achiever

Table - 5

Quadrant IV

(High IQ and Low SC)

Quadrant Rank Order	IQ scores	Neuro-ticism	Extra-version	SC scores	HS Total	HS Science subjects	NSTS scores
1.	117	24	28	77.75	519	419	
2.	113	28	32	73.75	421	326	
3.	106	32	32	75.25	540	423	
4.	103	24	24	80.00	523	432	
5.	106	38	22	68.00	498	376	
6.	109	29	31	59.00	526	412	
7.	96	31	23	74.75	461	351	
8.	109	30	22	48.25	481	374	
9.	96	24	21	58.00	520	411	
Means	106.11	28.89	26.11	68.31	498.78	390.45	

Table - 6

Quadrant III

(Low SC and Low IQ)

Quadrant Rank Order	IQ scores	Neuro-ticism	Extra-version	SC scores	HS Total	HS Science subjects	NSTS scores
1.	91	36	32	80.50	449	346	
2.	94	21	27	70.75	416	313	
3.	91	17	32	74.00	557	449	
4.	94	36	29	66.75	508	392	
5.	88	23	24	75.00	490	372	
6.	91	28	30	64.50	465	323	
7.	88	39	25	69.75	485	355	
8.	85	20	24	62.25	490	374	
9.	85	32	20	74.50	399	304	
10.	94	29	24	55.75	419	315	
11.	81	18	34	77.50	414	300	
12.	81	17	26	75.50	427	312	
13.	81	38	35	70.00	549	431	
14.	81	37	26	67.00	507	399	
15.	78	18	18	65.65	544	445	
16.	70	43	34	79.75	544	445	
17.	78	30	23	59.25	458	350	
18.	72	24	24	66.25	467	337	
19.	75	24	38	52.00	466	352	
20.	72	26	25	56.25	491	372	
21.	81	30	26	35.50	496	388	
22.	75	32	17	34.75	287	194	
Means	83	28.09	26.95	65.15	462	350.45	

QUANTITATIVE CONCEPTS, VERNACULAR, AND EDUCATION IN PAPUA NEW GUINEA

John Jones, Education Research Unit,
University of Papua New Guinea

ASSUMPTIONS

1. Effective learning is dependent on the design of an educational programme which takes into account what the learner already knows and can do, which utilizes his conceptual strengths and is framed in a context which is intelligible and familiar.

2. Most teachers and curriculum designers are not trained in field work, anthropology or linguistics so "common sense" approaches are necessary to the design of teaching programmes related to the cultural milieu of the community.

3. Language is an important indicator of conceptual development and environmental perception. The language of a community has evolved to fit the culture in which it exists: the way in which the symbols of a language represent reality must to some extent reflect its native speakers perceptions of their environment and the way in which they cope with it.

AIM

To investigate whether it is possible to collect language information simply and quickly which could be utilized in a "culture-based" approach to curriculum design. To carry out this investigation in the area of quantitative concepts and their use in the development of maths/science programmes in Papua New Guinea.

PROCEDURES

Working with the headquarters staff of the Summer Institute of Linguistics (S.I.L.) a questionnaire was constructed and sent to all S.I.L. field workers in Papua New Guinea. All of the questions could be answered in an open-ended way if the respondents so desired, so responses were not necessarily invalidated by constraining them within a narrow range. Thirty questionnaire forms were returned; of these 26 had been filled in at great length and obviously a lot of care had been taken in completing them. These 26, each representing a different language group, were utilized in the analysis, some of which is described below. Although the questions were mainly linguistic in nature, the main concern of the questionnaire related to educational problems; accordingly most of the analysis was carried out from that viewpoint.

QUESTICNNAIRE

Macrae (1974) in a discussion of quantitative features which are common to all cultures puts forward the following suggestions:

Measuring, set theory (or classifying), Ordering, Counting systems.

These are topics which are contained in practically every mathematics syllabus, for suspecting that a "culture-based" approach to mathematics (particularly in the early stages) might be feasible. This list was subdivided and extended somewhat to give the following specific areas which the questionnaire was aimed at.

1. Measuring

Length; Weight; Time; Speed; Height; Distance; Area; Volume.

All of the concepts listed above are quantitative, and have specific units which enable them to be measured precisely in Western situations. Much of basic maths and science is concerned with the description and manipulation of these concepts.

2. Classifications

Modern approaches to mathematics rely very heavily upon set theory, which is basically a means of classifying objects and concepts according to various attributes which they possess. The basic structure of formal logic can also follow on from such a scheme. So, it is not difficult to see why the ways in which people commonly classify can be of central importance in determining approaches to mathematical and scientific studies. The vocabulary of classifications ("Not All", "Only", "Some" etc) is important too.

3. Ordering

The ability to order objects in terms of a given quantitative attribute (weight, length, volume, etc.) is easily seen to be important, both for the real understanding of the attributes and for the logic underlying the ordering system. Contexts in which initial ordering exercises are framed are going to be important. The vocabulary of ordering - "bigger than", "shorter than", "the heaviest", etc. is also of importance.

4. Counting systems

The "base-ten" system of counting used in Western culture is arbitrary, having evolved on the basis of man's physical characteristics. Alternative systems are equally valid, and where these exist they are of obvious importance for beginning number work.

Causality/Conditionality

In scientific explanation the notion of a regular cause and effect mechanism is crucial. Even in Western societies, where the idea is well-developed, the perceived nature and "strength" of cause-effect relationships tends to depend upon the context. Choosing the right contexts for work could be important in early teaching programmes.

The questionnaire was organised into fourteen short sections, with all sections having a similar format. In the main, respondents were asked to assess how difficult or easy it was to express the sense of a particular sentence (in English) in the vernacular with which they were working. They were asked to rate the ease of translation on a seven point scale from 1 (= easy: short utterances which clearly carry the same meaning as the English expression) to 7 (= very difficult: practically impossible to express in vernacular). In addition, there was room for comment after each item. On occasions, respondents were asked to describe local systems of numerating, measuring length, determining time etc. Some examples of the above are given below, under the headings described above.

1. Measuring

"The two pieces of wood are the same length"

Easy | 1 2 3 4 5 6 7 | Hard

"It takes the same time to build a house as it does to plant a garden"

Easy | 1 2 3 4 5 6 7 | Hard

Are there any commonly used units of length? If so, please list those which you know of.

"The area of A plus the area of B is equal to the area of C"

Easy | 1 2 3 4 5 6 7 | Hard

"The distance between A and B is the same as the distance between C and D"

Easy | 1 2 3 4 5 6 7 | Hard

etc.

Classifications

Are the following distinguishing classifications commonly made in your local context?

1. Living/Dead Yes/No.
2. Natural/Man-made Yes/No.

"All men are living things, but all living things are not men"

Easy | 1 2 3 4 5 6 7 | Hard

"Some guks are nifs; this is a guk, so it might be a nif or it might not be"

Easy | 1 2 3 4 5 6 7 | Hard

etc.

Ordering

These items occured throughout the other sections: e.g.
"A is longer than B".
"It took a longer time to walk from A to B today than it did yesterday".
"He is the biggest man here".
etc.

Counting Systems

Can you describe the counting system which is used locally?

"Two stones plus three stones equals five stones"
"Four groups of three boys each equals twelve boys"
"Half as much"
etc.

Causality/Conditionality

"Event A happened because event B happened".
"Whenever event A happens, event B follows it".
"If and only if event A happens, then event B follows it".

In addition, a few specific terms were aimed at through sentences such as the following.

"The population of the village is increasing/decreasing"
"Not all of the people can go"
"At least three people were killed"

etc.

The largest amount of information collected from the questionnaires related to the way in which various quantities were measured, and how easy it was to describe and operate upon these concepts. Description, understanding and measurement of these concepts occupies a central position in much of the primary and secondary maths and science which is currently taught it PNG. It follows that the extent to which these concepts are developed and the ways in which Western and local parallels might exist is of importance for teachers and curriculum designers. The remainder of this report is concerned with an analysis of the information relating to quantitative concepts and their measurement, and a discussion of how this information might be utilised in the implementation of a more "culturally-based" educational programme.

FINDINGS

MEASUREMENT

When we talk about measuring something, what we are doing is to describe how many times bigger a given attribute of an object is than the same attribute of some "standard". Some common attributes used in measurement are those which have been described earlier: viz: Length, Weight, Height, Distance, Speed, Area and Volume. The results from the questionnaires indicate that not all of these contexts are equally suitable for the teaching of the basic activity of measurement (which is not at all surprising). This becomes very obvious from a consideration of several aspects of the responses.

To start with, we may look at the difficulty rating for the sentences associated with the various concepts, and we find that in general the following broad statements can be made.

(i) Statements relating to the concept of length and weight are made relatively readily in most vernaculars, and this is particularly the case for length.

(ii) Statements relating to the concepts of Area and Volume are made only with considerable difficulty in the vernaculars.

(iii) Statements relating to Height, Distance and Speed are made with middling difficulty.

As an example of this, consider the statement:

"The length of (A) plus the length of (B) is equal to the length of (C)".

Nineteen out of the twenty-six respondents rated this on the "easy" end of the scale.

By contrast, the statement:

"The area of (A) plus the area of (B) is equal to the area of (C)" was rated on the "Difficult" end of the scale by seventeen out of the twenty six respondents.

I t also appeared from the open-ended comments which were made that the use of length and weight measurements (again, length in particular) are far more common than for speed or volume say. Some interesting

comments were made with respect to the various techniques of measurement which are employed. A selection of these is given below.

1. Lengths of cane are used as measuring rods when constructing new houses. The canes are used to measure the intervals between the poles of an existent house, then these measurements are transferred direct to the new house.

(Dadibi/Mikaru; S. Chimbu)

2. (In describing a length measurement) "Put your arm three times and get me a length of wood as long as that" or "double-span" (fingertip to fingertip) three times" etc.

(Rossell Is., M.B.D.)

3. Only relative weights exist - heavy, very heavy, heavy little bit, not heavy, etc.

(Patep. Mumeng, Morobe)

4. Weights of various woods are compared with each other, as are bags of fish and coffee and cases of fish. But it is each man's impression; usually referred to as "heavy" or "light".

(Daga; M.B.D.)

5. (With reference to "Distance") The local unit is "a day's travel" or "a stage", which is not very precise.

(Woodlark Is., M.B.D.)

6. There are terms for: truly fast, fast, no so fast, not so slow, slow, truly slow, stopped. There are no local measurable units of speed.

(Rotobas, B'ville)

7. One can only say (in relation to area) "my garden is bigger than yours" - just by looking at it - but not using units of area.

(Langimar, Morobe)

8. "Size" would be used for area. A statement like the above ("The area of my garden is bigger than yours") would be made after visual observation only. There is no method of measuring the garden area.

(Binumarien, Kainantu)

9. Not possible (to say that "The volume of water is equal to (local units)". Unless you said it was the same as the water of N coconuts or N joints of bamboo.

(Nasioi, Bougainville)

10. The people would not think of (the volume of) a solid rock and liquid water using the same words. A rock's volume is in a different class from the water's volume.

(Korafe, Tufi: N.D.)

Taking these statements as being representative of many others which were made in a similar vein, it is possible to discuss some ways in which the teaching of measurement might arise most naturally out of the cultural background. To begin with, it might be necessary to defend the point of view that teaching programmes should arise out of the cultural frame-work. Knowledge, concepts, learning of any real form can only arise out of a framework of experience. It is pointless trying to explain the meaning of "red" to a man who was previously blind and has just regained his sight. One has to present him with a series of red objects so that he comes to gain the concept of redness. A similar approach can be used to teach the colours, blue, yellow, green, etc. Afterwards, one can explain that "colour" is a generic term embracing all of these primary concepts - but to attempt to define colour before he has experienced the range of sensations would be ludicrous. True, a blind man could be taught that "red" is the "sensory impression which results from light of wavelength about 7,000 A^{o} falling upon the retina" - but such a learned definition is completely meaningless to him since it has no experiential context. This is an extreme example, but it has its potential counterparts in many parts of educational programmes.

If we assume then that a background of experience is necessary to enable any meaningful learning to take place, then two basic approaches are possible within a teaching programme. One can teach so that learning arises out of experiences commonly encountered in the culture or one can neglect the cultural context and provide (or at least make the attempt) the necessary range of experiences as an integral part of the programme. There are problems associated with this latter approach. Probably the most serious of these is that the educational programme is perceived as being totally distinct from "real life" - samting bilong skul - whereas most programmes in PNG (and other parts of the world) are now aiming in the direction of a closer affinity between school and community. A second problem is that in many cases it is possible for dysfunctions to occur between school and community learning; totally different approaches may be brought upon the same problem in the two contexts, without school or community acknowledging the existence of the alternative approach. This must surely lead to confusion and misunderstanding. The arguments for building upon the existent experiential framework are persuasive.

We now proceed with the discussion by noting first that measurement was described, basically, as the number of times bigger a certain something is in comparison with a standard something. (For example, we measure length in terms of a standard metre). Comment 1, above, is interesting in that it indicates that there is no need for a standard unit when measurements of house dimensions are made during this particular building process. The house itself is taken as the standard, and a replica constructed simply by transferring a dimension, marked on a piece of bamboo, from the old to the new. This is a perfectly sensible procedure, so long as one is concerned only with replicating lengths. One would need to be careful in bringing up the concept of a standard unit of length, and its usefulness, in such a context where procedures can function perfectly well without it. Comment 2, on the other handindicates a context in which the concept of a

unit measure of length could very easily be introduced. If the name "metre" were tagged onto the arm length measurement, then one would immediately be into an introduction to the Western system of measurement. There are appropriate and inappropriate contexts where the concept of a unit measurement can be introduced.

Comments 3 and 4 are interesting (and representative of a large number of others) in that they demonstrate the way in which descriptive terms, in a specific situation, can take on the meaning of "absolutes", and in effect become terms of measurement. Now, it is true that we do this in a Western context also and indeed primary maths procedures currently in use in PNG (Mathematics Primary Syllabus: Department of Education, Konedobu) are aimed at teaching the meaning of "long" and "short" and "heavy" and "light" through very concrete procedures. There could be something to be said though for using the situations in which such comparisons are commonly made, before moving onto less familiar and obviously engineered situations. In this way, a link between school and the outside world might become more apparent. Also, one should be at pains to bring out the fact that the terms heavy, long, distant, etc. are comparative to some situational norm which always exists; that is, they are made with reference to some kind of vague standard. This could easily lead into a programme of measurement in terms of standard units.

Comments 5 and 6 also feed into the kind of discussion of the last paragraph. They indicate the sort of trouble which is likely to occur in getting across the idea of fixed and constant units. "A day's travel", referred to in comment 5 is probably the most appropriate distance unit in the cultural context. But, it is going to vary according to the specific journey which one is talking about - and it is very important to bear this in mind if one attempts to introduce the Western concept of distance, particularly in relation to length of journey.

The next two comments, 7 and 8, which relate to Area, indicate quite clearly the kind of problem which one would be likely to encounter in getting across the concept. The concept of area, and its measurement, has simply not developed in almost all of the groups covered by the survey - presumably because it has never been needed. True, the possession of land is of central importance: but size alone is not the only criterion which has to be borne in mind. Fertility, location, terrain, etc. all contribute toward the desirability of a piece of land, in addition to its size. (A study of the Australian real estate market will illustrate a similar phenomenon in Western society). If, then, one is to introduce the concept of area, it would have to be done with these constraints borne in mind; a context where area was the prime factor would have to be chosen. A couple of interesting teaching suggestions were made.

"Perhaps it could be taught in terms of how many coconuts could be planted, since these are almost always planted at regular intervals" (Nasioi; Bougainville)

(Area could be taught in the context of) Number of potato rows, and number of vines planted in each" (Kewa; S.H.D.)

Both of these suggestions are interesting in that they indicate that direct analogies between local and Western schemes do in fact exist. In the first suggestion a "coconut space" is a standard (and fairly fixed)

unit of area, while in the second there is a direct relationship with the measurement of area by "length times breadth". These relationships might well be used in teaching strategies.

The last two comments point out the similar difficulty which exists with the volume concept. In general, the concept of volume as "space occupied", regardless of what occupies it, is not needed in village society, and this is clearly indicated by comment 10. So, one would need to be careful in the introduction of the generalised concept, and a more gradual approach, using liquids in the manner indicated by comment 9 might be more valid. Another similar teaching suggestion was received:

"(Volume could be taught) in terms of metal cooking pots of water or in terms of varying lengths of bamboo tubes, with bamboo tubes, both length and diameter could be variables easily maintained and measured"

(Rotobas: Bougainville)

" A cooking-pot full" is a perfectly respectable unit of volume, and the bamboo tube is as close as one is likely to get to a graduated measure found in laboratories. In general, what is being suggested is that there are a great variety of possible starting points from which one can take off, in any teaching programme; and it seems to make sense that the starting point should be one which is already familiar and comprehensible to learners. Eventually, of course, one has to leave familiar situations with which learners are acquainted; but the transition is eased by at least starting off on common ground. This principle of moving from the known to the unknown or from the relevant to the less relevant is well illustrated by the following comment which was received.

"Coffee growing has made a start as a cash crop. The people are being paid according to the weight of their coffee, and this is for most the only encounter with the Western "weight" concept. It is a meaningful context, as they are being paid for labour and the labour is concretely expressed in the weight of the bag of coffee beans. They are intimately acquainted with the fact of the bag's weight, having carried it for miles! Some have the feeling that they may be getting cheated by those who do the coffee buying, since the sellers do not understand the system of weight"

(Dadibi/Mikaru; Kainantu, E.H.D.)

Having set up the principle that teaching programmes (particularly in adult education and early primary) should start off from the culturally kown known, the next sections indicate which situations are likely to be easy and which difficult, through an analysis of respondents' ratings of the ease of utterance of various sentences. The figure in brackets following each sentence is the weighted mean "difficulty" score which was attached to each. A score of 1.0 indicates extreme ease, while 7.0 indicates very great difficulty. (For example, (i) below scores 6.0 and is thus rated as being difficult, while (iii) rates a score of 1.2, and is thus considered to be quite easy).

Length

(i) The length of the piece of ground is (local units). (6.0)

(ii) The length of the pole is nine feet (accepting that people will not understand "nine feet"). (3.7)

(iii) The two pieces of wood are the same length. (1.2)

(iv) The length of (A) plus the length of (B) is equal to the length of (C). (3.1)

(v) A is longer/shorter than B. (1.5)

The sentence which is rated as being most difficult is the first, and this is entirely due to the fact that very few generalised length units exist in PNG societies (although a few rough measures do exist within specific contexts). Among the few general length units reported were the following:

Wagu:	40' - 50')	Daga, M.B.D.
Sewa:	4' - 6')	
Kiksi:	5' -	Faiwol, Kiunga. W.D.

In addition , a number of respondents reported measurements based upon body dimensions; e.g.-

long as your arm (	28")	
long as your leg (	35")	Rossell Is; M.B.D.
long as your finger (	$3\frac{1}{2}$")	

In general the rest of the sentences were not rated as being too difficult, and the main conceptual difference as compared with the Western, seems to be in either the absence of units, or of their being vague and non-unique where they do exist. For example, for Kamono-Kafe in the Eastern Highlands, the four "units" of length are "short" "like-short" "like-long" and "long", and similar adjectival units were reported from other areas. The difficulty which is likely to be encountered in introducing the invariant nature of units is well illustrated by the following comment.

"In teaching (length) the teacher should be aware of the local concepts. The fact should be stressed that the units of length, area, etc are constant and not just relative ; i.e. a foot is an exact length and is always the same length" (Mumeng, Morobe District).

These remarks concerning the unique nature of length units are also applicable to measurements of other attributes of objects, such as weight, volume, etc.

Weight

(i) The weight of the object is (local units) (5.9)

(ii) The weight of the object is 5lbs (accepting that people will not understand 5lbs) (4.3)

(iii) The two stones are the same weight (1.2)

(iv) The weight of the man is equal to the weight of the rock (2.6)

(v) The weight of (A) plus the weight of (B) is equal to the weight of (C) (2.9)

(vi) A is heavier /lighter than B. (1.7)

As with the concept of length, it is the idea of a generalised unit which gives the most trouble, and no weight units per se were reported. A few measures such as "As much as a man can carry" or "As much as a bag of sweet potato" were commented upon, but these are even more vague than the length measures which exist. For example, a list of weight terms confined to "heavy; a little heavy; light" as reported from Kiunga in the Western District is typical.

In addition, these adjectival terms can only apply to a specific context, and as such are being made implicitly in terms of a situational norm. For example, if we say that the bag is heavy, then we must have some kind of typical bag in mind to compare it with. This works perfectly well within familiar situations, but one is lost when it comes to describing weights in an unfamiliar context. In this case a generalised standard is needed. PNG culture in general lacks such a standard (because it has never been needed), and the introduction of such a concept would best be framed in a situation where it was seen to be useful.

Speed

(i) A runs faster/slower than B. (2.1)
(ii) A runs at the same speed as B. (2.6)
(iii) The pig can run twice as fast as the boy (6.7)

The third sentence is rated as being extremely difficult to translate accurately into vernacular; the main point which is made is that the exact quantitative relationship is just about impossible (and this holds for measurement of the other attributes too). To say that someone is running faster than someone else is relatively easy, as the difficulty rating for (i) indicates, but to quantify this further is very difficult. Some respondents showed considerable inventiveness in framing the translation in a way which would be intelligible.

"If you ran from here to the house, the pig could run from here to the house and back here in the same time".

(Kewa, S.H.D.)

"The pig running and reaching the water could return. And the boy could (just) reach the water.

(Nasioi, Bougainville)

This kind of discussion involving different distances travelled in a fixed time could be used as the basis for getting over the idea of comparative speeds. Certainly, there are considerable difficulties associated with this concept (in its Western sense) and this is well illustrated by the respondent who writes:

"Speed can only be expressed in general terms: ie, fast, very fast, slow, very slow. Lacking a unit of time and a unit of distance, there is no real way to express speed; hence no local unit of speed".

(Dadibi/Midaru; S. himbu)

It is interesting to note that in a large percentage of the vernaculars sampled, there was no comparative construction. This means that the idea of "faster than" (or "longer than", "heavier than", etc) may not have quite the same meaning as it does in English. Consider the following two examples, which are representative of comments made about sentence (i).

No comparison construction. "A runs fast. B runs slow".

There is no comparative degree in Binumarien, so the statement is not a concise one. However, it may be expressed as:

"A is a great runner - he is above B".

Now, the literal translations given above do not have exactly the same meaning, in English, as the original. First language speakers of English would agree that "A runs faster than B" has a different connotation from "A runs fast, B runs slow". It is interesting to note that attention has already been drawn to the "absolute" interpretations which Papua New Guinean students tend to place upon purely comparative statements. (Jones, 1972). In a discussion of the way in which PNG students responded to an item involving the word increase, the following statement was made.

"All it (ie. the sentence containing the word "increase") indicates is that population is now greater than it was some time previously, a fact which was understood perfectly by the first language sample - all responded correctly to the item. The second language sample, on the other hand, impose the extra implication that (a) the previous population was small and/or (b) the present population is large, and answer accordingly."

This imposition of the extra implications referred to above could possibly arise out of the fact that some of the respondents had first languages which contained no comparative construction. Hence there could be this tendency for purely relative constructions to be viewed in more absolute terms.

Height

Are there different words for "height" and "length"?	))	Yes - 9 No -17
Is "height" expressed differently from "distance"?	))	Yes - 11 No - 15

(i) The height of the tree (as apposed to length) is (local units). (6.1)
(ii) The two men are the same height. (1.8)
(iii) A is higher than B. (1.8)

It appears from the answers to the first two questions that in many cultures in PNG height is not distinguished from length. Going a little deeper into the replies though, one finds that distinctions are usually drawn (and indeed it would be rather surprising if they were not). However, one would need to be rather careful, in many situations, in

drawing distinctions between or comparing length and height measurements. The comments below speak for themselves.

A thing "goes up" for height, but is not really in contrast to the term for long; ie. either can be used for tall, but not both for long.

(Bena Bena, Goroka, E.H.D.)

Height and distance are not abstracts in the language. Neither is heard.

(Usarufa)

If an object is in contact with the ground, like a tree it is the same (as "length"). If separated by a space, like a plane, it is a different word.

(Woodlark Is; M.B.D.)

Length measured horizontally is measured as short, medium, long, etc; while height vertically is expressed as "its leg is short, medium, long etc."

(Patep, Mumeng, Morobe)

It is easy to say that two men are the same, but it is difficult to specifically indicate the idea of height.

(Aiua Kainantu, E.H.D.)

Often the two terms (for height and length) are mixed, so that length can also mean height - but not vice-versa.

(Daga, M.B.D.)

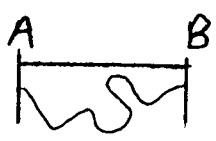
To get across that you were comparing height you would have to say - "these two men are the same. They are tall/short".

One comes up against exactly the same kinds of problem concerning units of height as one does with units of length. Usually they do not exist. A couple of respondents reported that referents, such as a length of bamboo, are used to transfer a height dimension from one location to another; this is in contrast to transferring the dimension in terms of a standard unit (such as a foot or a metre).

Distance

Is it possible to distinguish between distance "as the crow flies" and the distance from one point to another as one must travel between them?

Yes - 9
No - 17



(i) With reference to the diagram above how easy is it to say concisely:

"The distance between A and B remains the same, no matter which of the two paths one takes". (5.6)

(ii) The distance between A and B is (local units). (5.8)

(iii) The distance between A and B is the same as the distance between C and D. (3.2)

(iv) The distance between A and B is less than/greater than the distance between C and D. (3.0)

(v) A is farther away/nearer than B. (2.2)

Referring to (ii) we see that, as for the other attributes, it is difficult to specify a distance accurately, since no local units exist. The following two comments illustrate this quite well.

We can only say "as far as such and such a village from here"

(Rossel Is; M.B.D.)

The local unit is "a day's travel" or "a stage", which is not very precise.

(Woodlark Is; M.B.D.)

The high difficulty score given to the first sentence indicates that the distinction between "straight line distance" and "travelled distance" is hazy. This is not really surprising, since the concept of distance as "distance travelled" is far more useful in PNG cultures - and in most cases too in Western society. One respondent makes this point well:

The idea of distance is relevant only to the paths that must be travelled, so the distance between A and B depends upon the path.

(Patep, Mumeng, Morobe)

And this idea of the evaluation of concepts in line with perceived usefulness in the environment is illustrated beautifully by the following comment which refers to "distance as the crow flies".

Yes. (it would be easy to get the concept over) if you could convince them first that it is meaningful to talk about distances "as the crow flies". What good does a measurement do them? In our culture (ie. Western) no-one ever travels directly through the earth, so no distances are ever recorded as chords of the earth's circle, even though that would be the "real" distance.

(Nasioi, Bougainville)

This highlights very nicely the difficulty which is likely to be experienced in teaching concepts for which no use can be seen, and which do not arise out of experience. As the man remarked above, teaching distance between New York and Port Moresby as distance in a straight line through the earth would be rather ludicrous and somewhat confusing. However, the fact remains that "crow-flight" distance is a useful concept in many Western situations - but this concept is probably best left until it arises naturally out of a contest where it does have meaning. Air travel is an obvious example; and indeed this has had an effect in some places.

Our people do understand Plane Travel straight from Tufi to Wanigela

as opposed to the circuitous canoe trip. The word dambu can be used to indicate straight.

(Korafe, Tufi; N.D.)

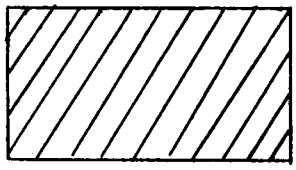
In some societies, the concept is obviously very well developed, as the following comment shows.

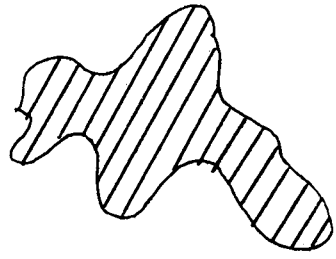
"If we went straight, the distance to go from A to B, or to go from C to D; their distance would be the same". ie. this distinguishes distance from length of the roads between places".

All one can say in general is that any effective educational programme which introduced western concepts of distance measurement would have to be aware of local concepts, and the programme would need to be planned accordingly.

Area

(i) The area of the garden is (local units). (6.6)
(ii) The areas of those two gardens are the same. (3.6)
(iii) The area of my garden is bigger than the area of yours. (3.3)
(iv) The area of A plus the area of B is equal to the area of C. (4.9)
(v)





"The areas of the figures are the same, although the shapes are different". (5.2)

The overall impression which one gets from the difficulty ratings is that the concept of area (in the Western sense) is handled only with difficulty. There is certainly nothing which approaches a unit of area, although - as was pointed out earlier - the "space needed for one coconut" or something similar could serve as a unit of area. As the respondent put it:

The best context (for teaching Area) would be garden size or cocoa plantings' size; related to number of trees per unit area.

(Rotobas; Bougainville)

A few comments will give some idea of the state of development of the concept in most of the groups covered.

One can only say "the two gardens are the same". This is ambiguous, as it might refer to fertility as well as size.

(Aiua; Kainantu. E.H.D.)

It's the concept that is difficult. One can say all these things in some way, but it is doubted in fact.

It could be said (ie. that the two gardens are equal in area) but it would always be debated.

(Bena Bena, Goroka; E.H.D.)

This last comment is interesting in that it does indicate a context in which a measure of area would arise naturally, and would be seen to be useful. An effective teaching strategy might arise out of this. Another respondent made this point well when he wrote:

Although at present there is no shortage of land, the situation will change if Chimbus are allowed to re-settle among the people. Then the matter of area will become more meaningful, and could even now be a good frame of reference.

(Dadibi/Mikaru; S. Chimbu)

It seems as if it is the area of land through which the concept could be most easily and validly introduced (this suggestion was almost unanimous), but there were some other suggestions too, such as from Rossel Is., where it was suggested that the area of different sails would be a meaningful context.

Volume

(i) Are there terms which express the volume of:

(a)	A block of wood.	Yes - 2, No - 24
(b)	An amount of water.	Yes - 8, No - 18
(c)	A rock.	Yes - 0, No - 26
(d)	The amount of space in a house or other hollow object.	Yes - 2, No - 24

(ii) The volume of this stone is equal to (local units). (7.0)
(iii) The volume of the water is equal to (local units). (6.8)
(iv) The volume of liquid in the two vessels is the same (4.3)
(v) The volume of the rock is equal to the volume of the water. (6.8)

(i) shows that with the exception of some terms for volume of water, the volume concept is almost totally absent from the sample of vernaculars. In addition, (ii), (iii) and (v) are all rated as being so difficult as to be almost impossible. This is not too surprising, since volume (as opposed to length or weight say) is a concept which can easily be done without in PNG societies. This is particularly the case for the abstraction of volume from two very different substances like rock and water. As one respondent wrote with reference to (v).

This kind of comparison does not exist, there being no reason for it.

(Binumarien, Kainantu; E.H.D.)

The idea of volume in relation to liquids is more immediately useful than it is in relation to solids (as far as most PNG people are concerned

anyway); so this is probably the best place to start. If one wants to develop the idea of volume as a general attribute of all materials, then the following comment - with reference to (v) above - should certainly be borne in mind.

If the container holding the water was obviously similar in volume to the rock, it would help. If the rocks were spherical and the water were in a thin bamboo, for example, the idea would probably be lost.

(Dadibi/Mikaru; S. Chimbu)

TIME

Time conceptualization is rather different from the other concepts (length, volume, etc) which have been so far dealt with, in that it represents a much less tangible entity. Even so, the quantitative aspects of time are of importance in many educational programmes and differences between Western and local systems could lead to problems for learners.

(i) All respondents reported that words or phrases existed in the vernaculars for the following time periods.

A. Two years.
B. Three months.
C. Two weeks.
D. Three days.

Years are reported as being measured in terms of (a) planting seasons (b) festivals (c) natural phenomena. For example:

(a) Year is equal to a "taro cycle" (Salt-Yui, Chimbu).
(b) Year = sing sing festival (Kewa; S.H.D.).
(c) Year is the same work, as the low-tide season, as the low-tide season comes each year. (Rossel Is.; M.B.D.)

Months are almost without exception equated with the phases of the moon; frequently "moon" and "month" is represented by the same word.

Weeks are in many cases represented by the imported pidgin word "wik"; in other cases it is referred to in terms of a specific day of the week: e.g.,

Two weeks = two Saturdays (Dadibi/Mikaru; S. Chimbu).

Days are usually referred to in terms of light/dark. e.g.

day = "sun-time" (Salt-Yui; Chimbu).

In answer to the question:

"Is there any countable unit of time smaller than the day?"

most respondents replied in the affirmative. However, from the examples which were given it became clear that what was being referred to were specific points in time, rather than a unit of time. In many cases, the day is divided up into a series of "time zones" which shade one into the

other. The complexity (or otherwise) of some of these is indicated by the example below.

Kamano/Kafe; E.H.D.

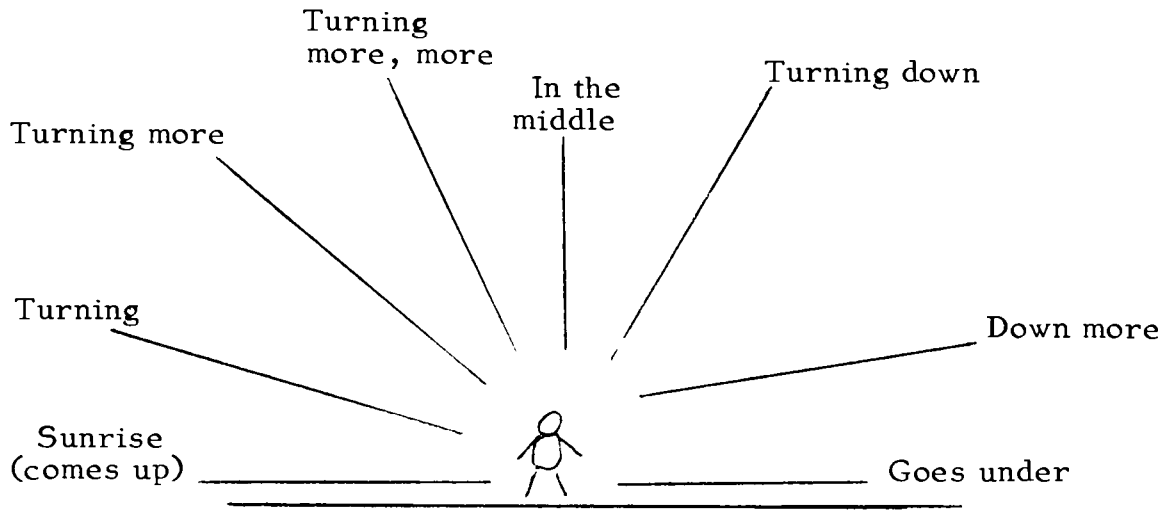
day light/sun up just morning sun rises		Till about 10.00 a.m. - morning
midday	10.00 - 2.00 p.m.	
sun turns	3.00 p.m.	
sun dies	5.00 - 6.00 p.m.	
dark	7.00 p.m.	
night	from bed-time onwards	
trying to light	3.00 - 4.00 a.m.	
about to light	5.00 a.m.	early morning
light	6.00 a.m.	

Woodlark Is.; M.B.D.

There are only terms for Morning, Afternoon and Night.

Kewa; S.H.D.

Time is judged by the position of the sun in the sky; now equated (in some sense) to points on a clock.



Given below are respondents' difficulty ratings for various sentences involving time concepts.

(i) It took a long time to build the house (2.1)
(ii) It took a short time to walk there (2.4)
(iii) At what time did you get there? (1.7)
(iv) I got there at (point in time) (2.5)

(v) I went there two months ago (2.0)
(vi) I will go there in two days' time (1.5)
(vii) In the past, I lived in that house (1.0)
(viii) In future, I will do as you say (1.1)
(ix) It takes the same time to build a house as it does to plant a garden (3.5)
(x) Yesterday I walked from A to B, today I walked from C to D, and on both occasions I took the same time (4.5)
(xi) I dropped the object and shouted at the same time (1.2)
(xii) Event A in location 1 and event B in location 2 occurred simultaneously (2.0)
(xiii) It took a longer time to walk from A to B today than it did yesterday (3.2)
(xiv) Doing activity A and then doing activity B takes the same time as doing activity C (4.2)

Overall, the sentences which deal with points in time, the past and future are rated as being quite easy to express. It is only when we get the concepts involving length of time, in a fairly specific quantitative sense, that difficulties arise. The following two comments are fairly typical:

(With Ref. to (x)). "The road is the same; cannot say that the time is the same".

(Kamano/Kafe, E.H.D.)

(With Ref. to (xiv)). This can be said, but it's awkward. If it is in units smaller than days, it's hard to express that it is the times which are being compared rather than the kinds of activities.

(Patep, Mumeng; Morobe)

The concept of simultaneity is easily handled by all of the vernaculars, and this is the case even when the events referred to occur in separate locations; several respondents indicated the existence of verb tenses which denote simultaneity. However, this is certainly not true in every case, e.g:

(With ref. to (xii)). "Only possible if both events could be described as near each other geographically".

(Bena Bena, Goroka, E.H.D.)

(With ref. to (xii)). "Event A happened and event B happened." The conjunction used indicates that they were either closely-related activities or were happening at the same time.

(Patep, Mumeng; Morobe)

From a number of responses it appears that "time" and "distance/space are often treated as the same basic concept. This does not lead to difficulties so long as communicators have a common understanding of a "normal rate of travel"; but, it can obviously lead to misunderstandings when a new context, with speed unknown, is encountered. This phenomenon is exemplified by the following responses.

(Ref. to (ii)). They would say "the road is short".

(Daga, M.B.D.)

It is possible to say these things ("it took a long time - - - -" etc) but only in relation to the normal time it takes to walk such a distance. A stranger to the culture would not understand.

(Binumarien, Kainantu; E.H.D.)

You would tend to talk in distance terms rather than time.

(Korafe, Tufi; N.D.)

(Ref. to (x)). Literal translation as follows:

"Yesterday from A to B I -reached. And today from C to D I-reached. Same reach-part to-feel/experience". (The two trips felt same in distance - both "time" and "space" are measured by "distance").

(Nasioi; Bougainville)

An appreciation of this perceived equivalence of distance and time (and the effect which this is likely to have upon the "speed" derivative) would be essential for any educational programme which sought to make use of these concepts. The almost total absence of a general unit of time (shorter than a day) - as opposed to distinct points in time, which are numerous - would also have to be taken into account. Insofar as units of time of the order of days, weeks or years are concerned, there does not appear to be any conceptual difficulty. Problems are more likely to occur when relatively short periods of elapsed time are considered. The area of "historical" time was not tapped in this survey; any conceptual difficulties associated with this domain are likely to be of a different kind, since it is outside peoples' direct experience.

DISCUSSION

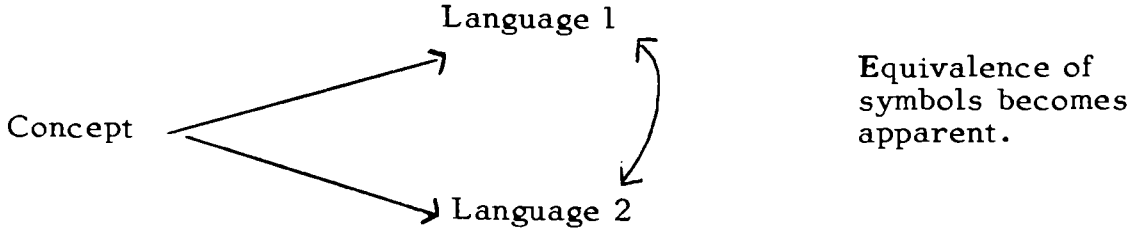
There have been a number of investigations within Papua New Guinea dealing with conceptual difficulties encountered by students throughout the educational system (e.g. Kelly 1971a, 1971lb, Prince 1969, Jones and Wilson 1972, Jones 1973). The purpose of this discussion is not that of spending a considerable time in synthesising previous work in the light of this report. There is no need, since the basic results of this earlier work can be summed up in a nutshell:

Students experience difficulty in dealing with Western science concepts, and are several years "behind" their Western counterparts.

It is important that teachers are aware of this fact, otherwise they would be making assumptions concerning their pupils which were totally unfounded. However, a recognition of the problems is not the same thing as a solution (though it is an obvious first step), and indeed it may be the case that a solution is not going to be easily located within the present structure of education in PNG. In order to amplify this last statement some consideration has to be given to the way in which culturally foreign material is digested - and a useful point at which to begin is that of the learning of a

second language.

Any language is a symbolic way of representing reality, and spoken or written forms of the language all have their referents in real-life experience. Consider, for example, the very simple concept of "girl". The word serves simply to represent a class of things which we know from life, and Madchen or Merched (in German or Welsh) serves equally well as a symbol. In effect then, learning a second language consists of learning new symbols for concepts which already exist for the learner. We can represent this process in the way shown below.



This can only work, of course, if the concept for which a new symbol is being learned exists in equivalent forms in the two cultures. If it does not, then the process becomes more complicated, and confusion is likely to occur. Bulmer (1971) makes this point well when he writes:

"Probably they (non native-speakers of English) assume initially that an English term has more or less equivalent referents to some term in their own language - the elementary pitfall of all learners of a second language. If it doesn't, confusion and loss of confidence in the use of the term then follow".

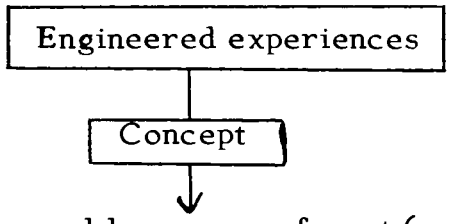
Dart (1971) puts forward an interesting suggestion for the teaching of "foreign" science concepts, by drawing an analogy between this and second language teaching. He writes:

"It seems to me that early science (should be offered) as a "second culture", valid in its own right, and taught in much the same spirit as a second language is taught. When an Urdu speaking boy or girl begins to learn English, there is no suggestion that Urdu is wrong, nor that English will totally replace his native Urudu. --- Science taught in this spirit as a "second culture" can be learned without the stress or conflict set up by attempts to unlearn an alternative set of relationships".

One feels bound to agree with the sentiment that a traditional body of concepts should not be devalued by the introduction of a Western system. Particularly since the concepts which are in existence have evolved in response to the needs of the community, its environment and its culture. But, whether one could effectively teach people to have the two systems existing side by side is rather more doubtful, and the language analogy rapidly breaks down. A more fruitful approach would be that of starting from "first culture" concepts, and moving to "second culture" alternatives through situations where the former are inadequate. In this way no devaluation would occur and the two systems could be viewed as an integrated whole with different interpretations applying in appropriate contexts.

Consider a fairly typical programme which might take place in a school

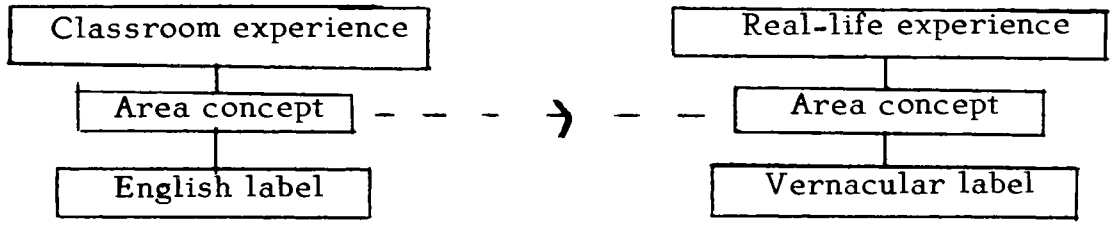
in Papua New Guinea, aimed at teaching some concept. (it could be "Area", "cubic centimetre", "bigger than", or anything similar). In the worst kind of teaching situations, the presentation is entirely chalk and talk - or just talk - and learners then have no hope of grasping what is being broached. A better approach would first of all involve the students in some activity, and out of these experiences an attempt at deriving the concept would be made. We can represent this approach schematically, as below.



This approach is perfectly respectable, but it has a number of drawbacks, some of which are listed below.

(a) learners' out-of-school experiences are almost entirely untapped.
(b) it is doubtful whether a sufficient experiential framework can be provided in the, usually, very short time available in the formal school situation.
(c) the learning which has taken place is meaningful only within the context of the school.

If one attempts to overcome drawback (c) by referring to the situation existing outside the school, then confusion is likely to result, simply for the reason that one is drawing parallels when it is very likely that equivalent referents do not exist (c.f. Bulmer's point above). Take a concrete example concerning the concept of "area". Kelly (private communication) has reported that in the Enga district the size of a piece of land is characteristically determined by measuring the length of two sides (in terms of some rough standard). The nearest approximation to "area" in the local culture consists of these two measurements. At the same time, students learn that area in the Western sense in defined in quite different terms, and they will normally have acquired the western concept (to some undefined extent) by activities involving sheets of paper or card. Now, to draw parallels between the "school" concept of area and the "cultural" concept is only to invite confusion, since no real parallel exists. To move from the classroom situation to the real-life context would be a long and painstaking job. It is possible to represent the problem as below.



Since the two area concepts are not the same, then the comparison can only lead to confusion, and certainly there will be no reduction in the compartmentalization of classroom and real-life experience. It follows too that the English word "area" cannot serve as a generalized label, but

will be confined to the specific classroom context. This is totally in line with the "learning without understanding" phenomenon and the inability to transfer knowledge and skills across contexts, which so many teachers complain of.

Suppose that instead of providing classroom experiences for students and extracting concepts from these, we started off by talking about the local concepts in English. Essentially, this would be an English learning exercise, since what one would be doing is to attach different labels to concepts which already exist for learners. In this way, a vocabulary of terms would be built up.

Succeeding stages of the teaching process would then consist of moving students from the cultural concepts to the Western concepts in contexts which are seen to be meaningful. Take the area concept as an example: practically all respondents reported that it is in relation to the size of pieces of land that this concept would have most meaning. So, it makes sense that the teaching of area should begin in relation to blocks of land (rather than with sheets of paper). If a system similar to that of the Enga, quoted above, is in operation then this system could be used initially to determine the areas (local-style) of various pieces of land. To break away from this system of area-measurement one would have to demonstrate that it did not work effectively in certain situations - because if it works effectively all the time, then why on earth should one want to change it anyway! This would be very easy to arrange in the above situation. It would be possible to take two gardens - one triangular and one rectangular for example - which had the same areas in local terms, and yet one of which yielded far more produce than the other. Ways of resolving this dilemma could be discussed, and it might turn out that the food production of the garden (c.f. the number of potato mounds suggested as a unit, in the section on measurement of area p. 32) is decided upon as an alternative measurement of size or area. From this it is only a short step to defining a unit of area as something like the amount of ground needed to generate x produce, which could be eventually defined in terms of length: and now we are talking about something which is very close to the Western concept of the measurement of area. To get from this point to a generalised concept of area, applicable to land, sheets of paper, pieces of cloth, etc, is still not easy and would have to be taken slowly. But, in terms of the very sound principle that one can only meaningfully move from the known to the unknown, students would seem to stand a much better chance of grasping the general concept when proceeding in this direction, rather than starting off in the artificial environment of the classroom.

One suspects strongly that the present structure of education, where students are extracted from their framework of real-life experience in order to learn, exists because it is superficially efficient. It is relatively easy to train a body of teachers to act in a specific way in an idealised and largely artificial environment; i.e. the classroom. Prescribed practices can then be carried out, and an appearance of meaningful activity easily maintained. However, severe doubt exists as to whether these procedures constitute, in general, an effective learning environment. In addition to the studies quoted earlier in this section, some unpublished work by Williamson (1974) is interesting for the way in which it shows how even a very well-designed and trialled programme can lead to minimal learning on the part of the students. Williamson investigated the extent to which standard 6 primary school pupils who had taken the TPPS phase 3

primary science course (almost certainly one of the best-designed programmes ever introduced in PNG) had understood the concept of volume and its measurement. He used an individual testing technique, where on pupil at a time was asked to carry out specific operations which would demonstrate an understanding of what had been covered in the course. The vast majority of the pupils performed dismally; in general, there was no understanding of the concepts which the programme had been aiming at, and there was a lot of confusion concerning activities which had been specifically covered in the programme. (It's worth mentioning that this investigation was carried out in an urban, demonstration school, where the execution of the programme was likely to have been far superior to that at an average primary school).

Some possible reasons for this failure of the programme are as follows:

(i) The amount of experience which it is possible to provide for pupils within the classroom is insufficient to enable them to derive the concepts which are being aimed at. At most, pupils spend about 45 minutes per week in handling materials and carrying out activities related to the science programme. This is a tiny drop in comparison with their real-life experiences.

(ii) The majority of the activities which are carried out are not meaningful in terms of life outside the classroom (a failing of most educational practices). Most of science and mathematics which is taught in schools in PNG only impinges on the fringes of life as most Papua New Guineans lead it. It is only possible to learn effectively when what is being learned is seen to be of use and to fit into a broader framework of experience (c.f. the comment made with regard to "distance as the crow flies"). Moving from the known to the unknown would consist of placing learners in a context where the known was no longer capable of dealing with the situation (as in the "area" example quoted above).

(iii) Many of the concepts - particularly the basic science concepts with which this report has been concerned - which are taught in schools are at odds with the concepts which exist and are useful outside school. (A host of examples of this originated out of the questionnaire replies). It would not be surprising if this led to confusion in the minds of the learners.

If one is to adopt an educational strategy which seeks to capitalise more upon the actual experiences of the learners, out side the classroom situation, then a radical shift of emphasis in teacher training is needed. Rather than the initiating of teachers into the mechanics of a well-defined syllabus, the training programme would have to concentrate upon turning teachers into "action researchers". The end-points or objectives of programmes would have to be specified, the starting points would not be (though some general principles could be formulated). And while some general strategies for shifting learners from known starting points to unknown end-points could be similarly outlined, the detail would have to be the province of the individual teacher. A few broad steps by which such a programme might progress are outlined below.

(i) In terms of the end-points of the programme, the nearest possible cultural equivalent for the learners would be identified. The initial phase would consist of elucidating the traditional version of the western concepts which are being introduced, and during this phase a vocabulary would be built up. All of this early work would, of necessity, take place in a context which was meaningful.

(ii) A situation where the traditional concepts broke down or were inadequate would have to be set up - again in a context which is as natural and meaningful as possible. Through this "conflict", it would be possible to modify the cultural concept and move it in a direction which is closer to the end point.

(iii) It may be necessary to produce more of these "conflict" situations before the learners arrive at the desired end-point. When they do get there, it will be in terms of situations which are meaningful and seen to be useful for real-life contexts.

(iv) At this point it may be desirable to shift into the more idealised atmosphere of the classroom and attempt to generalise the concept, applying it to more artificial set-ups and demonstrating its universal applicability. This is a difficult step - but it is usually the one which is attempted first in current educational programmes.

All of this of course will change the image of a teacher completely, and whether it would be possible to get the majority of teachers who are already in service to act as researchers is a debatable point. (See e.g. Jones and Kelly (1973) for some discussion concerned with this subject). However, it should be possible to train new teachers to act in such a way, and given sufficient moral and material back-up these new people could rapidly bring about a change in the system, particularly since material which was uncovered and approaches used would act as a resource for others in the same situation once it had been recorded. All over the world a move against the aloof and often irrelevant and meaningless nature of educational practice is gathering momentum; the main cry is that one cannot divorce education from the experiences of life outside school. (See Holt (1973) for a fluent and persuasive argument). Essentially, it is this move which is being echoed here; and other opinion in favour of such a move in PNG has been voiced too.

Philp and Kelly (1974) have argued in favour of building upon traditional concepts, in the teaching of maths and science (particularly with regard to classifications) and have suggested a "cultural games" approach. Prince (1969) too is suggesting something close to this approach when he remarks:

"The teacher himself can play an active part in forwarding the necessary research. Insights provided daily in the classroom can be recorded, written up and either published or passed on to others to record in their research material". (Bulmer (1971(is a most pressing advocate when he writes):

"It may sound utopian, but I for one would like to see every school in this country transformed into a junior research institute".

It's true that it does sound utopian; but on the other hand one begins to wonder how much longer the present educational structure, which gives its

students so little in the way of meaningful learning, can survive. The movement toward a more "community-based" system for PNG has produced a deluge of words over the last few years, and little in the way of results. If teachers were trained to become action-researchers, and if programmes were built on learners' meaningful experiences (which would then be inevitable), then a more community-oriented system would follow naturally. And it is a reasonable assumption that students would understand a lot more of maths and science than they do at the moment.

REFERENCES

Bulmer, R.N.H. (1971). "Science, Ethnoscience and Education." Papua New Guinea Journal of Education. 7, 1, 22-33.

Dart, F.E. (1971). "Toward a scientific attitude in developing countries." Papua New Guinea Journal of Education, 7, 2, 19-26.

Holt, J. (1973). Freedom and Beyond. Penguin: Harmondsworth.

Jones, J. (1972). "Comprehension of some commonly used works: a study with tertiary students in PNG". E.R.U. Report 4, UPNG.

Jones J. (1974). "Cognitive studies with students in Papua New Guinea." E.R.U. Report 10, UPNG.

Jones J and Kelly, M.R. (1973). "Some considerations associated with the possible introduction of vernacular education in PNG." Report to the Director of Education, Department of Education, Konedobu, PNG.

Jones, J and Wilson, M.J. (1973). "Expectations of regularity in primary school pupils." E.R.U. Report 8, UPNG.

Kelly, M.R. (1971 a). "A two-criteria classification matrix with some Papua New Guinea children." Papua New Guinea Journal of Education, 7, 2, 46-49.

Kelly, M.R. (1971 b). "The validity of Bruner's Concepts of modes of representation of reality with a sample of Papua New Guinean children". Papua New Guinea Journal of Education. 7, 3, 33-37.

Macrae (1974). "Connexions between local cultures and mathematical education." Educational Development International April 1974. 85-89.

Philp and Kelly, M.R. (1974). "Cognitive development and the Papua New Guinea education system - some findings." Eighth Waigani Seminar, UPNG.

Prince, J.R. (1969). Science Concepts in a Pacific Culture Angus and Robertson; Sydney.

SCIENCE AND MATHEMATICS ACTIVITIES AND RESOURCES FOR TEACHER EDUCATION

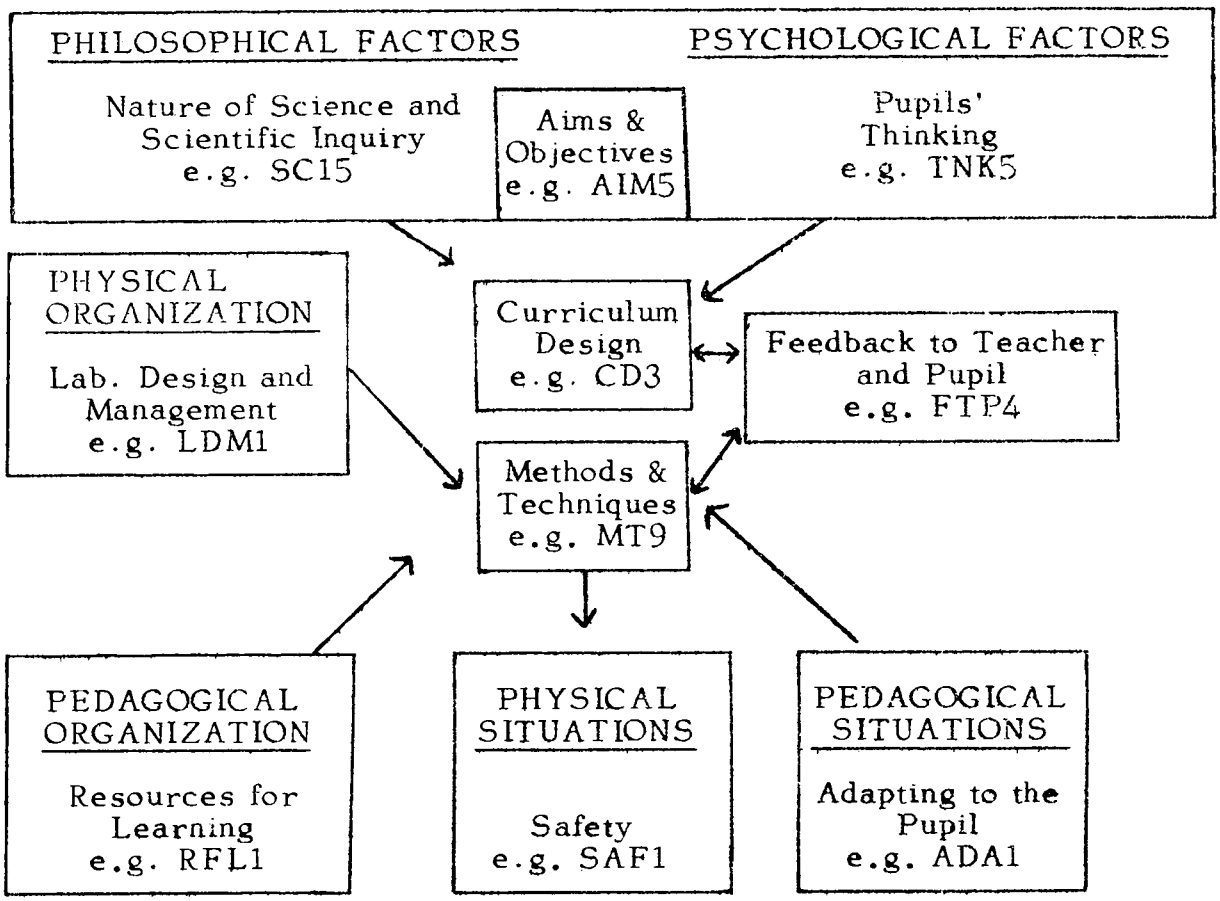
Faculty of Education, University of Malaya

This project was initiated in 1974, and implemented to the 1975/76 batch of Diploma students.

The objective of this project was not the adaptation of STEP materials, but to provide training through the use of STEP as resource material, and to initiate the production of relevant materials for the science and mathematics methods course.

Fourteen staff members participated in the project which involved approximately 200 students.

On the basis of the 10 "core" lectures in the Science and Mathematics Methods Course, 10 unit themes were selected. These 10 unit themes are diagramatically presented in their relationships as follows:



The code letters and numbers indicate the corresponding units of STEP materials.

THE IMPLEMENTATION STRATEGY

PHASE I: THE PREPARATION OF UNITS

During this phase students were assigned into groups of 20 according to their subject areas (First Method) to a lecturer who, subject to teaching practice constraints, was also their mentor and supervisor during teaching practice. Each group undertook to prepare one or two of the SMARTE units. Using the STEP materials as the starting point, the lecturer-in-charge would explore the unit intensively and extensively in terms of:

a) the unit as a learning experience.

b) the analysis of what has been learned (for teaching purposes) and what other outcomes/activities could be included from the point of relevance to both the subject method and the Malaysian context.

c) the re-organisation of the unit in terms of an instructional package or module for teacher education purposes.

Twelve contact hours were allocated to this phase, at the end of which a draft unit/s would be prepared by each group.

PHASE II: THE PLENARY SESSIONS

Ten plenary sessions, each of two hour duration were scheduled during this phase when presentation of units were to be made to all students involved in the project. The presentation could include simulated activities, the viewing of films on teaching, and other such devices as are relevant to a given unit theme. The order or sequence of presentation was as follows:-

1. The Nature of Science and Mathematics
2. Aims and objectives
3. Pupil's thinking
4. Teaching Methods and Techniques
5. Resources for learning
6. Adapting to the pupil
7. Feedback to teacher, pupil
8. Curriculum design
9. Safety
10. Laboratory design and management.

Through these plenary sessions all students were exposed in a vicarious manner to all the units which make up the "core" of the course. At each session, each group gave a presentation (with the lecturer's help where necessary) of the experiences and activities of the group in preparing the unit, and the recommendations it has made for improvement of the STEP unit. Each presentation therefore will focus on two major aspects:

(i) the learning experiences for teacher education inherent in the unit, and

(ii) The recommendations for reconstructing or modification of the original material in order to widen its scope and relevance.

PHASE III: THE PREPARATION OF INSTRUCTIONAL PACKAGES

After all the plenary sessions, the individual groups again met at separate sessions for another 12-16 hours. The sessions provided opportunity for the students to discuss and reinforce their learning from the plenary sessions, and from the point of view of the project, to produce instructional packages in their respective subject areas, by the application of the principles acquired.

For practical purposes, each group was further subdivided into groups of 3 or 4. Each sub group chose 2 units from the common pool of plenary session units. For the first unit chosen, the focus was on their first method subject while for the 2nd unit, it was their 2nd method subject. At this stage, students worked on their own. Lecturers were expected to stand by whenever students needed to have consultations with them.

THE OUTCOME

The outcome of this project was a set of 10 "core" units prepared jointly by students and lecturers, and several outlines or "packages" for teaching individual subjects - namely, biology, chemistry, mathematics, agricultural science, and physics - which represent the application of the unit principles acquired.

A student evaluation questionnaire was also administered. At the time of writing this is being processed.

The effect of this method of providing pedagogical training is also being assessed through students' performance during the current teaching practice. A few weaknesses have been identified - such as the insufficient exposure or involvement in the "core" units other than the ones in which students helped in the preparation, and the lack of interest or motivation of individual groups during the plenary sessions. These will no doubt be remedied in future projects of a similar nature.

SMARTE thus represents one attempt at utilizing STEP materials in the Faculty of Education. The main motivation, as explained by the chairman of the project, was the production of instructional packages for pre-service (and possibly in-service) teacher education. While STEP is seminar/tutorial oriented, the production of "core" units on the basis of co-operative effort of lecturers and students makes SMARTE more student oriented and in some sense, self instructional.

TEACHER ASSESSMENT OF PRACTICAL SKILLS IN CHEMISTRY AT ADVANCED LEVEL

R.T. Allsop, Department of Education,
University of Hong Kong.

Early in 1973 an initial survey was undertaken of the teaching of chemistry in the sixthforms of the 62 schools in Hong Kong which enter candidates for the local Advanced Level examination. This was based on work done earlier by Kerr (1) and Buckley and Kempa (2). Attention was focussed on the role of practical work in the sixth form course, but incidentally covered aspects of facilities within the schools, staffing in the schools, timetabling and budgeting for chemistry teaching. Altogether three questionnaires were used, the first to heads of science departments, the second to all science teachers and the third to a group of nearly 200 first year science students at Hong Kong University who had completed their sixthform courses the previous summer. The detailed findings of this work have been published (3).

Particular attention was paid to the position of practical work in the schools, under the influence of a practical examination externally set and marked which consists of volumetric and observational exercises. The content of school practical courses was predictably dominated by preparation for the examination. The thoroughness of this preparation in many schools was highlighted by the videotaping of the performance of candidates in the examination which showed that the examination was approached as a routine exercise based on similar practicals previously encountered. Teachers were invited to consider a set of objectives for practical work and then later were asked to consider to what extent these objectives could be achieved in a practical examination of existing type. The results of these considerations are given below:

Objectives	% of teachers agreeing they should be present	% of teachers thinking that stated objective was tested by present practical examination
A Development of manipulative skills		
A1. Manipulate apparatus	100	53
A2. Handle chemical substances safely	100	42
A3. Work accurately with reasonable speed	100	90
B Development of observational powers		
B1. Observe accurately	100	94
B2. Record observations correctly	100	87
B3. Read instruments correctly	100	73

Objectives	% of teachers agreeing they should be present	% of teachers thinking that stated objective was tested by present practical examination
C Ability to interpret experimental data		
C1. Interpret observations and experimental data	100	94
C2. Assess and judge the reliability of experimental procedures	94	39
D Ability to plan experiments		
D1. Solve practical problems using standard experimental procedures	95	34
D2. Devise simple procedures to investigate chemical problems	92	10

Teachers showed overwhelming agreement with the objectives of practical work suggested to them, which is perhaps not surprising. They only had significant reservations about whether secondary school students should be expected to consider planning aspects of chemical laboratory investigations. However, when they considered what the practical examination appeared to assess, there was a substantial mis-match between their own agreed objectives and those measured in the practical examination. This clearly gives cause for concern. The practical examination appears to measure students' abilities over a very restricted range of skills. Most candidates do tolerably well in this part of the examination, suggesting thorough preparation in the schools. The question obviously arises as to whether a student's practical work should be judged only over such a limited range of abilities. It is certain that the present practical examination could not assess over the whole range of abilities listed previously. An attempt was made to seek teacher opinion on alternative methods of assessment. Teachers were given three methods of assessment and asked to indicate their order of preference for these. The results are given below in terms of the percentages of teachers choosing a mode of assessment as their first preference:

Type of assessment	Percentage of teachers
1. End-of-course examination such as the present A-level practical	27%
2. Teacher-based assessment over two years, assessing specific abilities and grading to a set scale	21%
3. Teacher-based assessment plus a practical examination	52%

Teachers tended to take a median position in the face of an unknown by choosing the third alternative. Following this work, interviews and discussions with many teachers and examiners, it was decided to launch a pilot study of teacher assessment of practical work for a two year period, 1973-75.

Details of a scheme of teacher assessment were circulated to all schools with sixthforms and volunteers invited for the pilot project. Over half of the

A-level schools in Hong Kong volunteered, but only 15 could be chosen, approximately 25% of the total. They were invited to undertake teacher assessment of either one or two groups of students, either for the academic year 1973-74, or for the full two year period of the sixthform from 1973-75 with a different group. The majority of schools carried through both stages of the project. It was made quite clear to teachers and students that the study was not operational as regards its influencing the A-level grades of their students in any way - they would still be expected to sit for the standard practical examination. The scheme used was substantially based on that of the Joint Matriculation Board in Britain, which in turn has close relationships with the other two schemes of teacher assessment currently operating at this level in Britain, those of the University of London Board and the Nuffield Advanced Chemistry also run by the London Board. Teachers were asked to make assessments of five abilities using a five point scale for each ability. The abilities to be assessed were:

A. Skill in observation and accurate recording of observations
B. Ability to interpret practical experience
C. Ability to devise critical experiments
D. The possession of appropriate manipulative skills
E. Attitudes to practical work.

Teachers were given some guidance as to the kinds of experimental work which might be suited to assessment and some indication of the different ways in which they might choose to assess students' work. All teachers in the scheme were given one full day of training and induction, during which time they assessed practical work in progress in one school. They were asked to make at least two assessments for each ability except the last (E - Attitudes) which was to be assessed once at the end of the course.

Information as to the nature of the experimental work assessed was received from the report forms submitted by each school. The range of experimental work assessed was very wide, going far beyond the confines of volumetric and qualitative analysis, even though teachers had been warned against radical changes in programme as their students were still to be committed to a practical examination. The popularity of experimental work recently introduced in in-service courses reflects a continuing need for teachers to be given access to new experimental ideas.

Teachers reported no great problems in following through the schedule of assessments, except in respect of Ability C (Ability to devise critical experiments), which was assessed less frequently than any of the other abilities, and in which students were given significantly lower gradings than in the other abilities. An operational scheme of teacher assessment would have to include a re-statement of this ability. Teachers also gave consistently higher ratings for Ability E (Attitudes to practical work) than to any other ability. They were clearly reluctant to mark down students in this respect, although it later emerged from a questionnaire that they were quite willing to assess this ability. It is clear from analysis of teacher assessments that in general teachers are able to put their students in rank order within a teaching set, and that the rank order produced correlates well with the performance of their students in the overall A-level examination (correlations between 0.5 and 0.6). However, teachers in different schools assess to very different means which bear very little relationship to the total A-level population There is, therefore, a very clear case for retaining the rank orders produced by teachers' assessments with the application of an appropriate moderating

instrument to place them in the appropriate segment of the A-level population.

The search for an appropriate moderating instrument has puzzled all workers in this particular aspect of teacher assessment. In Hong Kong, a compulsory question was introduced on to the written papers, which purported to test practical experience. While discriminating well between candidates, it correlates very poorly with teacher assessments of practical skills and with virtually all other measures. It seems that the question tests something quite different, probably related to interpretation of data in one form or another. The teacher assessments correlate poorly with candidates' scores in the practical examination (0.20 to 0.26), figures which are confirmed by Wood and Ferguson in their work on the London Board's trial (4). This seems to suggest that the restricted scope of a practical examination makes it an inadequate instrument for properly assessing performance in practical work. The best correlations with teacher assessments were obtained with candidates' scores on the total written portion of the examination (two three-hour papers) these varying from 0.43 to 0.59. It seems that the best available moderating instrument is likely to be found therein.

At the end of the two year trial period, a further questionnaire was put to all teachers and students who participated in the scheme. It was very encouraging to receive a one hundred per cent response. Both teachers and students felt that, given acceptable moderation procedures, this method of assessment of practical work gave a much fairer basis than a single three-hour examination. Neither students nor teachers felt that the student-teacher relationship in the laboratory had been affected adversely by the scheme, although this must be interpreted with caution as all knew that it was in non-operational trial form. Teachers were then finally asked to reconsider their overall position with respect to the assessment of practical work by stating their preference as below:

In the light of your experience would you prefer:

(a) Teacher-based assessment plus a compulsory question based on practical work in the written paper	36%
(b) Teacher-based assessment over two years	21%
(c) End-of-course practical examination such as the present A-level practical one	15%
(d) Teacher-based assessment plus a practical examination	21%
(e) No assessment of practical work	7%

It should be recognised that this list of possibilities is not exhaustive. When compared with a similar question earlier mentioned, it is clear that there has been a strong shift of emphasis in the teachers from the trials schools. Most teachers in the trial (78%) had clearly gained sufficient confidence to feel that an element of teacher assessment was a useful component of an overall assessment in chemistry. The percentage wanting both teacher assessment and a practical examination fell from 52% to 21% of our sample.

Finally, the attitude of those teachers involved in the trials towards the A-level process as a whole is perhaps the most important feature to emerge. The involvement in what has been both a process of continuous assessment, continuous formative and summative evaluation and continuous curriculum development has undoubtedly contributed to the professional growth and competence of those teachers involved.

REFERENCES

1. Kerr, J.F., Practical Work in School Science, Leicester; Leicester University Press, 1963.

2. Buckly, J.G. and Kempa, R.F., "Practical work in sixth form courses - an enquiry", School Science Review, Vol. 53, 1971, p. 24.

3. Sanders, H. and Allsop, R.T., Aspects of the Teaching and Examining of Chemistry at Advanced Level in Hong Kong, Hong Kong; University of Hong Kong, Department of Education Research Unit, 1974.

4. Wood, R. and Ferguson, C.M., "Teacher assessment of practical skills in A-level chemistry", School Science Review, Vol. 56, 1975, pp. 605-608.

THE EFFECTS OF CERTAIN FACTORS UPON SCIENCE ORIENTATION IN A SAMPLE OF JAMAICAN FIFTH FORMERS

Marlene Annette Hamilton, School of Education,
University of the West Indies, Mona, Jamaica.

Many developing nations are not fully attuned to the necessity of providing a background in science required of the individual for effective citizenship in general, or for those entering scientific and technological vocations, specifically. Even if such awareness exists, these nations may not have the financial resources with which to implement this need. Jamaica epitomizes a developing country caught between these two vices. Having entered upon the road to technological advancement, she has thereby been committed to educating her people in science. Yet, observation of local trends over the years is indicative of a society which cannot be considered a science orientated one.

If one adopts the view that positive science orientation is necessary and desirable - and it appears to be the sine qua non for survival in our present technological age - then one should seek to discover possible reasons for the obvious lack of progress in this area. Research along these lines was conducted by the writer. Salient details of the study are outlined in the ensuing discussion.

THEORETICAL FRAMEWORK

An investigation into the evolution of science education within the Island provided certain relevant features. Historically, Jamaica was one of the last British colonies in the West Indies to develop a secondary system of education, and thus it is possible that progress may well have been hampered by such a late start. Even as the system became more well defined, it was seen to illustrate a distinct similarity to that of Britain the "Mother Country", and as a result aspects of the curriculum content were often irrelevant to local students. (To cite an example, students of botany were expected to be familiar with the primrose - a flower not found in this part of the world).

The "classics" were initially prestige subjects taught at the secondary level, and it was not until about the 1920's - 1930's that sciences were sufficiently well established to become popular among students. Once this shift of emphasis occurred, sciences became the prestige subjects, generally reserved only for the brightest students (and especially boys rather than girls). Cambridge examination results, as well as the annual graduate output from the University of the West Indies both attest to limited numbers of students majoring in the sciences. Hence, although one admits that the utilitarian value of science now appears to be recognised, yet the attitude of Islanders at large suggests that there remains the desire for traditional prestige professions such as law and medicine, rather than for those vocations needed to provide the country's economy with the manpower necessary for its future progress.

Since the role of the secondary school in providing foundations in science was a major concern, the writer sought out relevant researches staged both at home and, (as was more frequently found) abroad. From these, a host of independent variables which appeared to influence science orientation at the secondary level were identified, together with the expected results and instruments used to ascertain such results.

Within this theoretical frame of reference was defined and delimited the proposed area of investigation. While this may appear to be in contrary sequence to the design of most scientific researches, it must be borne in mind that investigation of science orientation in the Jamaican society imposed a specific problem, in that it encompassed virtually unexplored territory. It was only after the theoretical framework had been laid that one could get a clear indication of possible approaches available.

THE INVESTIGATION

This research sought to probe the effects of certain variables upon science orientation, in a select sample of Jamaican boys and girls in their fifth form year of secondary schooling. Independent variables selected for investigation, (categorized as personality, educational and environmental), had each been previously identified from the literature as those which appeared to influence science orientation favourably. Science orientation was accepted as: "Any special qualities of personality, mind, intelligence, background or upbringing that marks a person as a potential scientist, or at least, as one who has developed a method of approaching life which may be called the Scientific Method." Students' G.C.E. "O" level science grades were used as the criterion measure.

There were actually three phases to the investigation, one main and two subsidiary, the main one concerned with obtaining ratings for 576 students on each of the 30 independent variables selected. Data thus obtained were subjected to two major analytical procedures:

1. Orthogonal Factor Analysis, through which the following factors emerged by way of Varimax rotation:

A "School Environmental Factor" for both boys and girls; a "Scientific Ability Factor" for girls only, and with the criterion measure loading significantly here; a "Scientific Inclinations Factor" for both boys and girls, although the criterion measure loaded significantly for boys only; a "Social Environmental Factor" for boys: and a weakly defined "Personality Factor" displayed in the case of girls only.

2. Stepwise Multiple Regression, found to be of greater importance than factor analytical procedures, and through it the best predictors of science orientation were selected in order of importance. For girls, these were two "Educational" variables (Early Educational Experiences and results on a test of Spatial Ability), coupled with one "Personality" variable (Scientific Attitude). For boys, three "Educational" variables were regressed (Vocational Aspirations; Liking for Science - Favourite Subject; and results on a test of Abstract Reasoning). Hence, overall, educational variables were the best predictors in both instances.

One of the two other areas studied, sought to make further explorations of certain results arising from factor analyses and multiple regressions namely, some of the strongest features, as well as findings which were surprisingly weak. As a result of these explorations, a sex difference was defined in favour of boys. Those students continuing to sixth form and G.C.E. "A" levels were also observed, and it was shown that for them, sciences were the most popular options selected, although less than half the students deciding to specialize in sciences did not qualify as science orientated types, according to criteria established by regression predictors.

The final phase of the investigation looked at the practising Jamaican scientist, in order to establish criteria against which findings for the school sample could be judged. It was shown that personality characteristics made little impact on the scientist, but certain educational variables such as early school experiences, basic intellectual ability and liking for sciences, did emerge as important determinants positively related to science orientation.

IMPLICATIONS

The involvement of a people in science and science-related fields is often used, in a broad sense, as an index of the particular nation's development. While there may be arguments against adopting this measure, the writer is of the opinion that it is justifiable, and contends that although the merit of science orientation may not be directly measurable in a cost benefit-type analysis, so many other aspects of development impinge it - in fact, upon scientific literacy - to make it a desirable feature to be fostered. She thus submits that Jamaica needs to educate scientifically literate individuals - characterized as those having an understanding of (a) basic concepts in science, (b) the nature of science, (c) ethics that control the scientist in his work, (d) interrelationships of science and society, (e) interrelationships of science and the humanities and (f) differences between science and technology - so that there exists an informed public capable of taking an intelligent part in decisions geared towards social change through the advancement of society.

We also wish to prepare scholars in the several disciplines of science, and also to provide the background required of individuals entering technological/scientific occupations. Resources are limited, hence the need exists to identify those potentially most likely to succeed in scientific fields, and afford them the opportunity of such training. Persons faced with the responsibility of selecting these candidates would be forced to consider carefully their criteria for selection - to define both the desirable inputs of the situation as well as the learning outcomes sought. The value of this particular research lies in its exploration of such considerations within the Jamaican setting, in the trends indicated from the findings, but above all, in the elementary groundwork it has provided for more extensive and sophisticated research to be based.

EVALUATION OF THREE PHASE PRIMARY SCIENCE

Michael Wilson, Faculty of Education,
University of Papua New Guinea.

Since mid 1970 an evaluation of the Papua New Guinea Three Phase Primary Science course has been underway, carried out by the Teaching Methods and Materials Centre of the University of Papua New Guinea. This evaluation was requested by the Papua New Guinea Department of Education and has received financial assistance from that Department and from UNICEF. The evaluation has been undertaken in two major parts. The first was confined to Phases I and II (Standards 1-4) and took place during 1970-1972, the second covers Phase III (Standards 5 and 6) and is not yet completed. These two parts of the evaluation are reported in detail in Wilson (1972) and Wilson (1974).

EVALUATION AIMS AND PROCEDURES

The evaluation, particularly that of Phases I and II, has concentrated on the school and classroom situation. This has seemed appropriate in view of the fact that the pedagogy of TPPS teaching was and is very different from that of other areas of the primary school curriculum. So the first question to be answered was - Does TPPS operate in the classroom as is intended? To answer this question one must ascertain what is intended and then go and see. We have done this by analysing the course, observing on a personal basis and asking others to observe lessons and report their observations to us. For Phases I and II we asked Head Teachers in primary schools to do this using a highly structured, largely objective observation form in classes in their own schools.

This provided reports on 2481 science lessons. Later in the evaluation of Phase III we wanted to look in more detail and depth at what was happening in Standards 5 and 6 classes and so confined observational work to experienced science educators (mainly the research assistant, the writer and Teachers College science lecturers) using a much less structured, largely open ended observation form. So far this has provided reports on 125 Phase III lessons.

Further assessment of the school situation was obtained from discussion with Head Teachers and science teachers in addition to results from a 'Science Teacher Interview Form' completed by 77 science teachers.

In the second part of the evaluation while classroom observations have continued to be important we have also aimed to assess the effects of the course on the children and in particular the extent to which it is achieving its objectives. The objectives are set out briefly in the Teachers' Handbook and stress interest and enjoyment in gaining scientific knowledge and the development of an attitude of enquiry. We have not attempted any objective measure of the development of an attitude of enquiry (lesson observations giving some indications and suggestions about how this might be done

will be most welcome)! We have much subjective evidence of interest and enjoyment from lesson observations. In addition we have constructed two pupil attitude scales in an attempt to measure:

1. attitudes towards TPPS lessons and
2. understanding of and attitudes towards science itself.

To some extent this goes beyond the stated objectives of the course and we believe that it is quite legitimate for an evaluation to do so.

In respect of cognitive objectives of the course we have analysed the content of each Phase III lesson in terms of the skills and concepts involved and in this way have made a determination of the implied cognitive objectives of the lessons. On the basis of this analysis we have constructed a short series of multiple choice tests for administration to Standard 5 and 6 pupils at the end of each Phase.

Finally two attitude scales for primary teachers relating to science teaching and to science have been constructed, piloted and modified. These are at present being used in an investigation of teachers in the field and at various stages of pre-service college courses but as yet no results are available.

RESULTS

I present here the conclusions recorded in the reports on the two stages of the evaluation.

First the evaluation of Phases I and II.

"The general conclusion, albeit subject to some important qualification must be that in many important respects it TPPS does fulfil the organisers' expectations. The results from the 2481 Observation Forms and the 77 Teacher Interview Forms show that the position with respect to the supply of necessary equipment by UNICEF, the District Education Offices and the teacher himself is generally good. (More recent evidence suggests that this may not be the case in 1974.) The teacher gets the activity under way without difficulty, although there is some evidence that the initial issuing of instructions is not always effective. During the lesson the teacher supervises and assists the groups but often has difficulty in answering pupils' questions. Meanwhile the pupils themselves normally have little difficulty with the activities which arouse considerable interest and enjoyment. The pupils also talk among themselves, often in the vernacular, particularly in the lower standards. After the activity there is often discussion and sometimes some written follow up work.

From Standards 1 to 4 there is a progressive decline in the use of the vernacular and an increase in written work, in pupil questions and discussion and in pupils' difficulties with the activities. The course appears to be equally successful in rural and urban schools and in Mission and Administration schools, a major difference being the much wider use of the vernacular in Mission schools. A further analysis shows that there is a general, although small, improvement in the success of the course as teachers' experience increases, which augurs well for the future.

The most outstanding success which TPPS has achieved is the interest and enjoyment which it generates amongst the pupils - the weekly science lesson is an eagerly awaited event in most primary schools.

The major failure of the course relates to its much stressed aim of encouraging questions and a "spirit of enquiry". Pupils ask very few questions indeed even in Standards 3 and 4. Teachers make only limited attempts to overcome this by encouraging questions. Of course, a "spirit of enquiry" may possibly be abroad in TPPS classrooms without this manifesting itself in questions to the teacher - pupils may for example pursue their enquiries through the activities. There is some evidence however that this does NOT happen to any marked degree. Quite frequently teachers mention that pupils are not fully occupied or that the lessons are too short - thus indicating that pupils are doing little more than simply carrying out the basic activity as instructed by the teacher. One important reason for this failure is no doubt that little that goes on in other areas of the curriculum in primary schools encourages a "spirit of enquiry". It is asking a lot that children be metamorphosed in half an hour of science each week from passive receivers to active enquirers, particularly as the traditional culture and education which constitute the pre-school background of most children demand unquestioning acceptance of adult authority. But an equally important reason is teacher lack of science background and consequent lack of confidence in science lessons. While they can organise the basic activities they feel that they do not understand the science relating to them well enough to answer questions. If they feel they cannot answer questions they will not encourage them. If children are not encouraged they will not ask and if when they do ask it is frequently clear that the teacher cannot help and may even be embarrassed (especially as he is 'The Science Teacher' and teaching a class which is not his own) the children will be inhibited further.

Another area of concern with the TPPS course which is in fact closely related to the above is the evidence from various sources in this evaluation that pupils are not as fully active as one would expect in an activity course. Sometimes this takes the form of waiting around while the other three members of the group have their turn with the mirror, lens, magnet or whatever, sometimes the children have simply finished everything they have been told to do in ten minutes. Occasionally pupils may be seen developing or changing the activity in an interesting direction but they rarely pursue this and even more rarely is it taken up to the teacher. He does not develop and extend the activities on the card for the same reason as he is reluctant to encourage questions - because he does not understand the purpose of the activity or its relationship with things beyond the activity.....

Another area in which the course is not operating as intended is in the use of the vernacular. In Phase II the vernacular is not to be used but is in fact being used in up to one-third of science lessons. This is an area in which in the writer's opinion the teachers' and pupils' usurping of TPPS policy is to be commended. It seems most likely that in many science lessons, particularly those involving a first contact in school with the natural environment which is already familiar to pupils from out of school and traditional activities, the use of the vernacular could do much to bridge the gap between traditional and school

knowledge - a gap which is causing much concern in Papua New Guinea at the present time.

Finally several minor failures should be noted. Firstly many schools have failed to promote the idea of a "science room". This is stressed in the Teachers' Handbook and can do much to extend science teaching beyond the basic one half hour each week. Next there is a small minority of teachers (about 10%) who teach TPPS without understanding or perhaps just ignoring the basic philosophy of the course. They tell children the answers before they have a chance to try to find out for themselves. This may in fact be more widespread than appears from this report as it may well not have been apparent to some observers that it was happening. Finally the one piece of equipment which causes considerable trouble is the spirit burner. More TPPS lessons have been ruined or omitted because of burners which threaten to set fire to the school than by any other cause." (WILSON (1972) pp. 33-36)

This record is on the whole a satisfactory one for the widespread introduction of a radically new curriculum into the primary schools of a developing country.

The conclusions of the Phase III (Standard 5 and 6) evaluation are less encouraging.

"Phase III of TPPS provides experiences related to a wide range of scientific phenomena which generally arouse considerable interest and provide real enjoyment for primary school pupils. But the work reported here shows that considerably more difficulties are encountered with Phase III than was the case with Phases I and II. Lesson observations show that teachers frequently have trouble with the provision of needed materials, with coherent issuing of initial instructions, in understanding what the activity is all about and in stimulating and dealing with questions. Long term experiments and the recording of the outcomes of activities are often neglected. The result of these factors is, as shown by the results of the cognitive tests, that pupils understand only the simplest ideas involved in the activities and that there is little difference between those who have and have not done a particular TPPS lesson. Children enjoy their science lessons but have not fully understood the importance of the activities as a means of finding out for themselves.

There is little evidence of any attitude of enquiry or initiative on the part of either pupils or teachers. At the same time there is evidence of differences in behaviour, attitude and achievement between boys and girls - uniformly in favour of boys. Children have a reasonably accurate and favourable image of science and scientists but tend to believe that science is difficult and wider in power and application that is in fact the case. There is little difference in the image of science of children who have and have not done TPPS.

Some concepts are introduced and developed in such a short time that it proves quite impossible for the pupils tc grasp them - the teachers themselves are sometimes not clear of the purpose of an activity and often unsure of the underlying science. There is a very big difference between the level of activity and understanding utilised

in Phase II compared with Phase III." (WILSON (1974) pp. 32-33)

These latter are tentative conclusions based on an incomplete evaluation of Phase III.

Full details of the evaluation procedures, results and recommendations for the development of TPPS are contained in the three evaluation reports listed below.

WILSON, Michael (1972) An evaluation of Papua New Guinea's Three Phase Primary Science Project. Report of Phases I and II. Teaching Methods and Materials Centre, Research Report 14. University of Papua New Guinea

WILSON, Michael and WILSON, Audrey (1973) Three Phase Primary Science Evaluation of Phases I and II. Report to Schools. Teaching Methods and Materials Centre. Research Report No. 20. University of Papua New Guinea.

WILSON, Michael (1974) Three Phase Primary Science. Phase Three Evaluation. Interim Report. Teaching Methods and Materials Centre, Research Report 24. University of Papua New Guinea.

NIUE WORD LIST

Dr Warwick Elley and Mr Ian Livingstone
New Zealand Council for Educational Research

In 1973 the New Zealand Council for Educational Research was asked by the Government of Niue to plan and carry out a research project designed to provide Niuean teachers with a list of basic words which could be used in schools in the teaching of Spelling. The current lists in use had been developed in metropolitan countries, and were felt unsuited to the spelling needs of Niuean children.

The Council accepted this request and invited all Niuean teachers of classes from Year 4 upwards to assist by providing samples of their children's written compositions. The children were asked to write two compositions on a variety of topics, and these were collected and sent to NZCER for analysis.

The compositions were screened for errors, typed out in full, and punched on to data cards for a computer analysis of the word frequencies. Approximately 135,000 running words were analysed in this way. The computer arranged all the words in alphabetical order, counted the total frequency for each word, (class by class and total) and counted the number of essays in which each word occurred. The differences between class levels were small, and inconsistent, so the results from seven class levels were combined into one. The absolute word frequency was found to be a more stable base to use than the number of essays in which each word occurred, but the latter measure was useful to identify words whose word count was artificially inflated.

A Niuean Word List of 900 words was prepared, in which each word had occurred at least 10 times in the children's written compositions. These 900 were found to make up 95% of the total words used. Only 4,500 different words were found in the analysis.

Plural nouns were not included in the list unless they were irregular (children) or presented a significant spelling problem (babies) or were rarely found in the singular form (lollies, crops). Only the basic form of verbs was included (arrive, but not arrived, arriving, etc.) unless the other forms were irregular and frequently used (know-knew; do, does, did, done, etc.). When different forms of the same word were combined their frequencies were also combined.

Comparisons with a comparable New Zealand word list (the NZCER Alphabetical Spelling List) revealed several discrepancies of interest. Niuean children used with higher frequency such words as coconut, plantation, bush, oven, village, uga, island, hunt, cook, canoe, assemblyman and local place names. High frequency words from the New Zealand list, absent from the Niue List included such words as bat, close, doll, fun, pussy, summer, toy, street, ice, elephant, frog, zoo, hotel, autumn, fireplace, gallon, glass, wheat, business, company, etc.

In summary, of the first 180 words on the Niue List (i.e. those with frequency over 100) 134 were placed in the first level (of seven) in the New Zealand list, 27 at Level 2, 5 at Level 3, 5 at Level 4, 3 at Level 6 and 3 not included at all. On the basis of these discrepancies, it was concluded that there was ample justification for a separate word list to be used by Niuean teachers in their spelling programmes.

LANGUAGE VARIATION AND LANGUAGE CURRICULUM MATERIALS

Dennis R. Craig, School of Education,
University of the West Indies.

Some of the findings of the work relevant to the morphology and syntax of the speech of Jamaican children are evidenced in Craig (1975) and Roberts (1975). In the latter articles it is shown that some of the basic characteristics of creole speech, such as those described in Beryl Bailey's Jamaican Creole Syntax (Cambridge U.P. 1966) form a background for very complex variation in the speech of school children. In many cases, specific characteristics of creole do not necessarily emerge in the children's language as basilect creole forms, but emerge instead as tendencies that create new language-forms within the continuum that can be observed between creole on the one hand and English on the other.

For example, in Jamaican Creole, the equivalent of the English verb 'be', in some environments, has no overt representation; also, certain types of activity or performance abstract nouns like 'medicine, law, teaching...' and so on, have no similarly abstract creole equivalents. These two characteristics of creole combine to produce in children tendencies that result in one set of phrases such as the following:

1. /.....waan tiicha /
   "want (to be) a teacher"

2. /.....waan dakta /
   "want (to be) a doctor"

3. /.....stodi dakta /
   ".....study medicine"

4. /.....torn taipis /
   ".....turn a typist"

5. /.....duu taipis /
   ".....do typewriting"

In Craig (ib id.) some examples such as the latter are discussed to show that the children producing the examples, and at the same time comprehending, as they do, the Standard-English equivalents, have created a blend of tendencies from both creole and English, and that this kind of blend cannot be adequately described within conventional grammatical notions. There are many other types of examples that illustrate the same process of the merging together of creole and English tendencies, like, for example, the disappearance of the creole negative particle / na / and its replacement by the English 'never' instead of the Standard-English negative form 'do/does/did not'; the gradual interposing of the Standard-English 'and' between linked verbs like / ron go bring di buk kom / '....run and go and bring the book' which in creole would have no overt coordinate link; the replacement of the creole

/ tek /+ NP by the Standard-English instrument phrase 'with' + NP in some environments and its retention in others: and so on.

Language behaviour such as that referred to provides a rationale for reformulating the notion of first-language interference with the learning of a second language, so as to include cases where it cannot be said that the second language is in any sense 'acquired', but a new language, intermediate between the first and the second, is created. This kind of process was commented on as early as Craig (1967) and has since been noticed within the notion of 'interlanguage' (Selinker 1972, IRAL, 10,3).

STANDARD-LANGUAGE TEACHING

In a morpho-syntactic first-language context such as that just explained, it has for some time been recognized that the straight teaching of Standard-English as a second language, i.e. by conventional second-language methods, would not be completely appropriate. The author has elsewhere (e.g. Craig, 1966, 1971) explained this in terms of a 4-level stratification of the learner's linguistic repertoire. However, the more recent studies of morpho-syntactic variation earlier referred to add a new dimension by dealing with the morpho-syntactic results of the learner's creativity in the relevant situation.

As an offshoot of the research programme to which this report refers, practical activities with teachers in workshops led to a development of strategies in classroom teaching and in the construction of language and early reading materials that take into account this morpho-syntactic creativity of the learner. Between 1973 and the present (1975) sets of English-language materials and teachers guides (Language Materials Workshop, U.W.I.) have been prepared at four separated grade-levels as an emergency measure (since material cannot be simultaneously prepared for all grades) for use in Jamaica. The grade-levels concerned are as follows: grade one, the beginning of the primary school (children $6\frac{1}{2}$-7); grades 6-7, the top of the primary or the beginning of the non-selective secondary school (children 12-13); grades 10-11, the top of the non-selective secondary school (youths 16-17); the first year of teacher's college.

These materials, except for grade 10-11 materials which are printed by the Jamaica Ministry of Education, are at present in mimeograph form. They have not yet been used in controlled experiments that would rigorously test their efficacy, but they have been tried out in schools or teachers' colleges and evaluated in terms of teachers' opinions of their value. The indications are that they are meeting long-felt needs.

Different teams of persons, to whom acknowledgement is due, have worked (in addition to the author) to develop the materials.* Some general principles which run through all of the materials are as follows:

---

* For grade one, the following individuals have shared in the work at different stages and at different times: Dennis Craig and Don Wilson of the School of Education (University of the West Indies), Peggy Campbell, Sybil James, Ann Jaansalu, Joyce Thompson, Betty Wilson and Pam Mordecai. For Grade 6-7 (Language 101/102) the team has been Dennis Craig and Grace Walker with assistance at different times from Winnie Carby, Jill Debenham, Marilyn Duchesne, Ralph Boyce and Moyra McDonald. For grade 10-11, the team has been Dennis Craig, Pam Mordecai, Kathryn Shields and Jill Debenham. The teacher's college preliminary language course (Language 20) was developed by Dennis Craig, Don Wilson, Pat Morgan and Lena Wright.

1. The materials provide for learners to receive concentrated practice in the use of each single morpho-syntactic element of English that contrasts with their habitual first-language usage. The techniques employed are the usual ones in second-language teaching methodology.

2. Simultaneously with 1 above for dialogue interchange and the active use of language in narrating, reporting and so on, learners are kept within a specific tense and aspectual usage of verbs at successive stages of their learning until they seem proficient in producing the forms of that tense and aspect.

3. There is constant reinforcement of previously learned elements at each successive stage, and the learner is forced by structured activities to combine learned elements into creative syntheses.

4. Because learners are accustomed to existing in a variation language-situation and therefore possess a passive control of many language-forms that they cannot produce, and because of the tendency earlier described whereby the learner created new language out of contrasting tendencies, teaching procedures combine a minimum of imitation and repetition with a maximum of forced choosing of a correct alternative.

5. In receptive activities, the learner is immersed as much as possible in language which is of interest because of content and which is not in any way controlled in vocabulary and structure.

These general principles are modified or added to depending on the grade-level for which materials are designed. At the early primary level, for example, teachers are given guidelines and resource materials for activities that will help the child to continue the normal development of his home language which is either creole or a form of mesolect; concurrently, the teacher is given guidelines and materials for an English-language programme that embodies the stated principles, except that principle no. 4 above has to be modified to ensure that the learner at this stage gets an adequate amount of imitating and repeating; reading is part of the latter programme, but the reading materials are morpho-syntactically controlled in order to use only such English as is actually being taught to the child. The latter is a radical departure from existing practice in which reading materials for the relevant children take no special account of their language situation.

The secondary-level materials embody the stated principles with less modification or addition, and it is not necessary at this level to have the same degree of a biloquial approach that is implied in the teaching methodology at the primary stage. It is at this level too that principle no. 4 above, which is modified for early-primary learners, becomes very important. It is by this principle that the teaching methodology is enabled to counter against the learner's habit of merging morpho-syntactic tendencies from both creole and Standard-English, as earlier discussed. By being exercised in operating within the context of language activities controlled as suggested additionally in principle no. 2, the learner is forced to choose between limited sets of alternatives at a time until the habit of such choosing internalizes a target element and frees the learner from the habit of merging different language systems.

Further necessary investigation related to these materials should involve controlled experimentation and comparisons of effectiveness, as well as some study of relationships between language-form and conceptual content or framework in the learners involved.

REFERENCES

1. Craig, D.R., Some Early Indications of Learning a Second Dialect. Language Learning, Vol. 16, 1966, pp. 1-2.

2. Craig, D.R., Education and Creole English in the West Indies. In: Pidginization and Creolization of Languages. Ed. D. Hymes, Cambridge University Press, 1971.

3. Craig, D.R., A Creole English Continuum and the Theory of Grammar: Paper presented at the International Conference on Pidgin and Creole Languages, University of Hawaii. To appear: Hawaii University Press, 1975.

4. Roberts, P., The adequacy of certain theories in accounting for important grammatical relationships in a creole language. Paper presented at the International Conference on Pidgin and Creole Languages, University of Hawaii, 1975.

5. Language Materials Workshop, School of Education, University of the West Indies, Jamaica. Grades 1 and 2 materials; Language 101/102; Grade 10-11 materials; Language 20.

THE ROLE AND STATUS OF THE YORUBA LANGUAGE IN THE FORMAL SCHOOL SYSTEM OF WESTERN NIGERIA: 1846-1971

Timothy A. Awoniyi, B.Ed. Hons., Ph.D.,
Lecturer in Education, University of Ibadan, Nigeria.

The study was designed to investigate the role and status of the Yoruba Language in the formal school system of Western Nigeria during the period 1846 to 1971. The underlying rationale is that mother tongue education teaching in the bilingual situation of African countries has all too often been neglected or not subjected to the vigorous investigation it deserves. This is because the mother tongues (unobjectively referred to as vernaculars) is sometimes neglected in the educational programme especially when another language (in this case, English the language of the colonial masters) competes with it.

This neglect has been decried in a recent meeting of Experts on Problems related to Teaching the Mother Tongue held at Hamburg. They declared:

> "among the many tasks of modern education, the training of pupils in the understanding and the use of their mother tongue has all too often been neglected or not considered in the spirit of urgency and experimentation which other curricular activities have enjoyed in recent years..."(1)

Yet, in a truly monolingual society where the language of the home is also the language of the school, few problems arise in determining the role and status of that language in the educational programme. But in a bilingual situation, there is the need, because of colonial experiences, to determine what circumstances of age and environment appear to have significant effects on the role and status of indigenous African languages. We now know that language as a medium and language as a content have significant implications for methodology and curriculum development.

But it seems that linguistic and educational findings, as well as our understanding of the mother tongue (henceforth M.T.) in the life of the individual and his society, cast some doubts on the wisdom of neglecting the M.T. in the education of the child. Very early in life, each normal human being becomes aware of his existence, and conscious of self and environment. The M.T. categorizes a large part of that environment.

The M.T. from the very beginning of life is closely associated with child's growth and development. That is to say that the M.T. is genuinely a part of his life and not just simply a subject to be taught at school. McCarthy (1954)(2) in her studies has shown that as the child matures, his language develops, and that through language, his personality and his experience are expressed. Carrol (1964)(3) has shown that language is closely related to concept formation, and the fact that in thinking, one may

use the organization of the environment given by the concept labels of one's M.T., and manipulate these within the framework of the grammatical categories of that language has led many to ponder, and some to proclaim the influence of language over thought. Indeed, language and culture are intricately interwoven and Silva-Fuenzalida (1949)(4) concluded that without language, i.e. the M.T. an understanding of functional distinction in culture may be impossible to grasp. In fact, the M.T. one uses is the basis upon which one's general culture and personality are judged. The M.T., therefore, is a part of culture; it conveys, or transmits culture; and itself is subject to culturally conditioned attitudes. Furthermore, numerous studies, The Iloilo Experiment (1953)(5), Nida (1949)(6), The Mexican Project (1953)(7), Texas Education Agency Report (1957)(8), Traveno (1968)(9), Platten (1953)(10), and several others, have shown that suppression of M.T. has devastating educational consequences for the learner, and were of the opinion that those who have little skills in writing and thinking in their M.T.s often have great difficulty in expressing themselves in a non-M.T.

To the child, the M.T. that he learns in his first years of life is not like a garment that he can put off when he dons his school uniform. It is part of the stuff of which his mind is built; it embodies the ideas and attitudes he has gained from his environment; it is the language through which he has acquired the earliest experiences of life; it is the language through which he thinks, dreams, cherishes, loves, scolds and learns.(11)

METHOD OF INVESTIGATION

The research was designed to test the hypothesis that:

> "The contemporary theoretical and practical problems, in regard to the teaching of the M.T. (Yoruba Language, in this case) in bilingual situations can best be understood in the light of the historical evidence in that particular society."

The study was therefore historio-descriptive. It was realized early enough that forces of many kinds - religious, political, economic, social, intellectual and educational - would have effect on the role and status of Yoruba (as M.T.) in the School System. Hence, the writer had to assemble historical data from somewhat scattered sources including (a) Mission Records; (b) Colonial Records; (c) Education Codes and Ordinances; (d) Records of Institutions; (e) Reports of Commissions, Conferences etc.; (f) Newspapers; (g) Syllabuses; (h) Organizations etc.

Also, in order to assess the contemporary role and status of Yoruba in the formal schools, a sample of 144 Schools was taken from a total School population of 3,691 in Western Nigeria as at 1971. The schools sampled were representative of the dialectal and geographical areas of Yorubaland excluding Lagos and Kwara States. Out of the schools sampled, 261 teachers responded in the urban areas and 474 teachers responded in the rural areas to the questionnaire. Out of the total number of 1,000 pupils sampled, 848 responded.

In addition classroom observations of Yoruba teaching and personal interviews were employed to counter check the response to the questionnaire. Non-parametric devices, such as percentages, frequency counts, rank

ordering, and paired comparison, were utilized for the analysis of the data collected.

MAJOR FINDINGS

Historically, the development of Yoruba teaching in schools can be grouped into three phases based on our findings viz:

(i) The Missionary Era, 1800-1882
(ii) The Colonial Era, 1882-1960
(iii) The Modern Era, 1960-1971.

THE MISSIONARY ERA, 1800-1882

The Missionaries, were missionaries first, linguists and/or educationists second. The underlying rationale for their mother tongue policy was the role these M.T.s could play in extending evangelisation. The school was seen as the agent of religious propaganda, and the M.T.s the media. The linguistic achievements of the missionaries in the realm of orthography, grammar and translation should be assessed within the concept above. They preserve the Yoruba language, but they alienate the Yoruba people for they teach them the language out of cultural context. Little wonder, the early converts were superb examples of europeanized Africans who were prepared to match the Europeans in everything - dress, behaviour, name, custom and language!

THE COLONIAL ERA, 1882-1960

It was an era of sceptical tolerance for the Yoruba language. The Yoruba language was not banned, but was not developed either. The colonial policy was a compromise between educational efficiency and political expediency.

THE POST-INDEPENDENCE ERA, 1960-1971

There has been rapid development in curriculum development, research, teaching and utilization of Yoruba in radio, television, newspapers, plays etc. This "renaissance" has as its underlying motive the sudden cultural awareness in the country. Africans are rediscovering themselves and their past.

Unfortunately, however, these changes, as far as our findings are, have little effect on the formal primary schools. Some of our significant findings include:

(i) Most teachers who responded to our questionnaire admitted that teachers did not know Yoruba enough, and that there were no adequately trained teachers to teach Yoruba in schools.

(ii) It is shown that most appropriate methods of teaching Yoruba were usually not employed and that there were no adequate teaching aids.

(iii) While Yoruba was of a high status among the pupils, and

acceptable to parents, yet teachers considered Yoruba to be of a low status because it was made optional in most examinations for the award of certificates.

(iv) It would appear that the Yoruba language was being neglected in the primary schools, in spite of the enthusiasm for it in the post-primary, post-secondary levels. Unless efforts were made to improve the quality of teaching the Yoruba language effectively at the primary school level, interest in it might dwindle, even at the post-primary level since no solid foundation in the Yoruba language would have been laid.

REFERENCES

1. Unesco: Institute for Education, Conference Bulletin. International Meeting of Experts on Problems Related to Teaching the Mother Tongue. December 8-12, Hamburg, January 1970, p. 1.

2. McCarthy, D., Language Development, in L. Carmichael (Ed.), Manual of Child Psychology 2nd ed. New York, Wiley, pp. 492-630, 1954.

3. Carrol, J.B., Words, Meaning and Concepts, Harvard Educational Review No. 34, pp. 178, 202, 1964.

4. Silva-Fuenzalida, Ethno-linguistics and the study of culture, American Anthropologists L1, pp. 446-456, July-September 1949.

5a. Orata, P.T., The Iloilo Experiment in Education through the vernacular. In Unesco (Paris). The Use of Vernacular Languages in Education. Monographs on Fundamental Education VII. pp.123-31, 1953.

5b. Aguilar, J.V., The Significance of Bilingualism in Philippine Education. Unpublished typescript, 1953.

6. Nida, E.A., Approaching Reading Through the Native Language. Language Learning No.2(1), pp. 16-20, Jan/March 1949.

7. Barrera-Vasquez, A., The Tarascan Project in Mexico. In Unesco (Paris) op.cit., pp. 77-86, 1953.

8. Texas Education Agency: Division of Research. Report of Pupils in Texas Public Schools Having Spanish Surnames, 1955-1956, Austin - Texas, August, 1957.

9. Traveno, Bertha A.G., Bilingual instruction in the Primary Grades. The Modern Language Journal, LIV (4), pp. 255-256, April, 1970.

10. Platten, G.J., The Use of Vernacular in Teaching in the South Pacific. South Pacific Commission Technical Paper No. 44, 1953.

11. Berry, J., Problems in the Use of African Languages and Dialects in Education. In Unesco (Jos) Nigeria. African Languages and English in Education. Unesco Education Studies and Documents, No. 11, pp. 41-48, 1953.

DIFFERENCES IN THE PERFORMANCE OF L_1 AND L_2 SPEAKERS IN USING STRESS RHYTHM AND INTONATION CUES OF ENGLISH TO DISAMBIGUATE SENTENCES

R.K. Johnson, Faculty of Education, University of Papua New Guinea

BACKGROUND TO THE EXPERIMENT

In these last ten years a great deal of work has been done on establishing the nature of the relationship between sense and sound; work that has centred upon the relationship between stress, rhythm, and intonation (S.R.I.) and underlying structures. Most of this work has been related to competence studies i.e. the intuitions of a native speaker about his language, rather than performance i.e. reaction to overt data. One of the problems faced by those working in this field has been that the researcher's internalized knowledge, is his reader's overt data and the reader's performance-based response often fails to confirm the original insight, without of course necessarily invalidating it.

The starting point for those studies most closely related to the experiment reported here has been summed up by Philip Lieberman as follows: "Intonation can furnish different meanings to utterances that have the same words by grouping the words into different blocks which direct the listener's recognition routines towards one underlying phrase marker rather than another". (1) Unfortunately (from a tidiness point of view at least), this is not the whole story. Lieberman has shown that the listener may use his internalized grammatical knowledge of the language to impose a S.R.I. pattern upon an utterance, which is not apparent in the acoustic signal itself. (2) The more complex position was stated by Chomsky and Halle as follows: "The hearer makes use of certain cues and certain expectations to determine the syntactic structure and the semantic content of an utterance....he will 'hear' the phonetic shape determined by the postulated syntactic structure and the internalized rules". (3) Here I take 'certain cues' to include S.R.I. cues in the acoustic signal, and 'certain expectations' to refer to the context in which the utterance is heard.

British linguists, those who have followed Firth, and in particular M.A.K. Halliday, have emphasized the importance of context. They maintain that language does not exist outside a situation of some kind which influences it. It follows that where no context exists, the listener must make an assumption concerning the context as part of his decoding process.

---

(1) Lieberman P.: "Intonation and the Syntactic Processing of Speech" in Models for the Perception of Speech and Visual Form. Ed. Weiant Wathen-Dunn M.I.T. Press 1967 (Proceedings of a symposium held in 1964), p. 315.

(2) Lieberman P.: "On the Acoustic Basis of the Perception of Intonation by Linguists" Word, 1965, 21 pp. 40-55.

(3) Chomsky N. and Halle M.: "The Sound Pattern of English", Harper and Roe, 1968.

Halliday sees S.R.I. cues as indicating probability: "as regularly with intonation choices, there is a probabilistic correlation but the choice remains". (4) Jan G. Kooij expresses the notion of probability rather differently: "It is plausible, as far as actual speech is concerned, to assume that disambiguation is always a matter of computing the probabilities over and against the phonetic cues..." (5) and later "It is well known that native speakers have in general no difficulty in assigning different functions to phenomena that, phonetically, are quite similar in nature. (This) means that on occasion, such functions may be very hard to discriminate in one particular sentence". (6)

The experimenter working on the disambiguation (by means of S.R.I. cues) of utterances presented out of context is therefore somewhat at the mercy of his subjects' uncontrolled expectations and/or inventive powers.

INTRODUCTION TO THE EXPERIMENT

The immediate objective of the experiment reported in this paper is to provide evidence of the difference in language performance between first language (L_1) speakers of English and second language (L_2) speakers of English in utilizing S.R.I. cues to disambiguate utterances presented out of context.

The study departs from general practice in applied linguistics in two ways: firstly by contrasting the learner's "approximative system" (7) with the native speaker, rather than contrasting the learner's mother tongue with the target language, and secondly by studying performance rather than competence.

Little contrastive analysis has been done on the S.R.I. systems of different languages, and from the point of view of language teaching, little would be achieved by such studies. Despite the undeniable influence of the stress and rhythm patterns of the learner's L_1 in his L_2 speech, the overall approximative system of the learner (I am thinking here particularly of L_2 English speakers in PNG), seems obviously different from that of any L_1 even to a casual listener, being characterized by a lack of pitch contrasts and vocal "colour" generally.

This observation is in line with the increasingly widely held belief that 'error' or deviation from the L_1 speaker's norm in the target language does not result solely or even primarily from carrying over the habits of the mother tongue into the L_2 but that errors are rather "signs of false hypotheses hypotheses" (8) similar to those made by a child learning his L_1, and that the making of such errors "is an inevitable and indeed necessary part of the learning process". (9)

---

(4) Halliday, M.A.K.: "Intonation & Grammar in British English",Mouton Mouton 1967, p. 36.

(5) Kooij, Jan G.: "Ambiguity in Natural Language: an investigation of problems in its linguistic description", North Holland Publishing Co. 1971, p. 37.

(6) Ibid. p. 44.

(7) Nemser, William: "Approximative Systems of Foreign Language Learners" I.R.A.L. IX/2, May 1971.

(8) Corder, S.P.: "Idiosyncratic Dialects & Error Analysis" I.R.A.L. IX/2, May 1971, p. 152.

(9) Ibid.

Past studies have also tended to contrast the learner's performance with that of an idealized native speaker i.e. with a competence model, a procedure which inevitably leads to ineffectual over teaching. It is assumed here that it is only by first establishing the nature of the operation of language rules in the performance of native speakers that we can determine how best to make L_2 performance approximate to that of the L_1 speaker.

Another good reason for contrasting the performance of L_1 speakers and L_2 speakers is to establish much more clearly the kinds of disadvantage the L_2 speaker is under. As more and more people become dependent on the use of a L_2 in education, commerce and administration, any such information is likely to prove extremely valuable.

Subjects

There were 37 L_1 speakers of English for Part I and Part II of the test. The fact that teachers of English and post-graduate teacher trainees formed a large part of the group makes it an unrepresentative sample, but more importantly, all the L_1 subjects knew the person who recorded the tape and were therefore familiar with his voice. (10) This was not the case with the L_2 sample. A much larger sample of L_1 speakers is to be tested at La Trobe University in the near future.

The L_2 sample consisted of 229 subjects for Part I, and of 209 subjects for Part II. They were upper secondary school students and post secondary school students studying at the Administrative College. These subjects' English was considered to be at or approaching advanced level, but to be sufficiently far short of complete bilingualism to throw light upon the inadequacies in the performance of L_2 speakers of English in interpreting S.R.I. cues to structural relationships in the language.

Test Items

Most sentences used in the test were taken from the literature where they appeared as examples of utterances ambiguous in written form but capable of disambiguation in speech through a particular S.R.I. pattern. The last three items test the subjects' ability to judge affective cues in the speaker's intonation.

The Method

The instructions for answering the test and the test questions were taped. The voice used on the tape has a Southern English accent. The speaker concentrated rather upon the meaning of what he had to say, than on producing a particular S.R.I. pattern. It was intended that the voice should sound as natural as possible, without undue emphasis or precision. Each test item was heard by the subjects only once except for questions 33 and 34 where a short dialogue was involved. For these two questions the test items were given twice.

---

(10) It was in fact the experimenter's voice, and knowing a person and the person's voice seem to be important factors, since it was the experimenter's wife whose choices came closest to those predicted. This suggests a number of intriguing possibilities for further research on inter-personal relationships as a factor in effective communication.

In Part I there are 30 test items each of which is ambiguous in its written form, but may be disambiguated in speech by S.R.I. cues to the underlying grammatical relationships. Subjects have 6 choices on their answer sheets as follows:

(a) & (b) Give paraphrases of the alternative 'readings'. e.g. 'English Teacher' may be understood to mean a) A teacher from England, or b) A teacher of English and the subject chooses according to his understanding of what he hears.

(c) Both meanings are possible.

(d) Neither of these meanings is possible.

(e) I am uncertain whether a) or b) is correct.

(f) I did not hear the sentence properly.

The main purpose of (c), (d), (e) and (f) was to discourage subjects from guessing. In the analysis these answers were classified as 'no choice'.

In Part II there are 23 test items involving 7 test units. The test units consist of words, sentences and dialogues which are repeated a number of times with variations of S.R.I. The subjects again indicate their response or non-response on the answer sheet. In these items the number of possible meaningful choices varies between 2 and 5, indicated by the letter Z on the answer sheet. Detailed instructions were given on the tape for each test unit.

RESULTS

The results for each question are given below. They are shown after each test sentence or item and the set of meaningful alternatives from which the subject can choose. The predicted choice is underlined. The L_1 responses are given on the left, the L_2 responses on the right. The first figure given shows the number of subjects who chose alternative (a), the second, (b) etc. and the last figure shows the number of subjects who made no choice. / represents a trend in the predicted direction. X indicates a trend in the opposite direction. ^{o} indicates no significant trend.

In Part II, the question item is spoken a number of times with a variety of S.R.I. patterns. The set of alternative readings remains constant with each variation, the predicted choice being different in each case. On the results sheet (below) each question item is given from the tape script once only, and is followed by the set of alternative readings. The resultant choices made by the two groups are presented as follows: the predicted choice (i.e. a), b) etc.) is stated first. The results are then given for the L_1 subjects: (a) N_1 (b) N_2 (c) N_3... (Z) N_4, where N_1 = the number who chose alternative (a), N_2 = the number of subjects who chose (b) etc. The number given after (Z) shows how many subjects either did not or indicated that they could not make a choice. The results for the L_2 group are presented in the same way. The /, X and ^{o} are used as for Part I.

The results are not presented in the order in which the variations on the test items were given on the tape. This ordering is shown by the number against the relevant paraphrase of the predicted choice.

TEST ITEMS & RESPONSES
PART I

1. I drove by the signs.

   a) I went past the signs - I missed them and got lost.

   b) I followed the signposts to the place I was going to.

   L_1 23, 6, 8 / L_2 65, 102, 62 X

2. I gave John what I wanted.

   a) There was something I wanted but I gave it to John.

   b) I wanted to give John a certain thing and I did give it to him.

   L_1 14, 17, 6° L_2 105, 84, 40 X

3. They don't admit any students.

   a) They admitted no students.

   b) They admitted a few special students.

   L_1 20, 10, 7 X L_2 170, 18, 41 X

4. She's a pretty interesting girl.

   a) The girl is both interesting and pretty.

   b) The girl is very interesting.

   L_1 11, 19, 7 X L_2 105, 69, 55 /

5. She didn't go to the doctor because she was sick.

   a) She did go to the doctor and she wasn't sick.

   b) She didn't go to the doctor and she was sick.

   L_1 26, 4, 7 / L_2 70, 59, 100 °

6. He washed and brushed his hair.

   a) He washed himself and then brushed his hair.

   b) He washed his hair and brushed his hair.

   L_1 16, 15, 6 ° L_2 112, 60, 57 /

7. I gave her dog biscuits.

   a) I gave some biscuits to her dog.

   b) I gave dog biscuits to her.

   L_1 0, 33, 4 / L_2 78, 115, 36 /

8. Tau the crocodile is dead.

a) Tau, I must tell you that the crocodile is dead.

b) A crocodile called Tau has died.

L_1 9, 23, 5 / L_2 98, 95, 36 °

9. He only lent it to me.

a) He lent it to me. He didn't give it to me.

b) He lent it to me and to no one else.

L_1 35, 0, 2 / L_2 106, 75, 48 /

10. I like amusing guests.

a) I like making my guests laugh.

b) I like guests who make me laugh.

L_1 9, 21, 7 / L_2 83, 77, 69 °

11. He has plans to leave.

a) He is going to leave here and go somewhere else.

b) He has some plans and will leave them here with us.

L_1 10, 21, 6 / L_2 97, 47, 85 X

12. He's an English teacher.

a) He teaches English.

b) He is a teacher and he comes from England.

L_1 11, 16, 10 / L_2 118, 57, 54 X

13. Old men and women often come here.

a) Only old men and old women come here often.

b) Old men, and young and old women come here often.

L_1 8, 19, 10 / L_2 168, 9, 52 X

14. I think that man is honest.

a) That particular man is honest in my opinion.

b) All men are honest in my opinion.

L_1 2, 30, 5 / L_2 128, 64, 37 X

15. He is a sweet salesman.

a) He sells sweets.

b) He is a goodnatured and pleasant saleman.

L_1 7, 25, 5 / L_2 120, 54, 55 X

16. He uses a steel cutting blade.

a) A blade which cuts steel.

b) A steel blade which cuts.

L_1 0, 34, 3 / L_2 50, 111, 68 /

17. The teacher spoke to the boy with a smile.

a) The teacher was smiling as he spoke to the boy.

b) The teacher spoke to the boy. The boy was smiling.

L_1 33, 1, 3 X L_2 193, 11, 25 X

18. There's a car behind the garage that needs paint.

a) The car needs paint.

b) The garage needs paint.

L_1 13, 18, 6 / L_2 144, 24, 61 X

19. They were both happy and excited.

a) There were only two people.

b) There may have been more than two people.

L_1 4, 24, 9 / L_2 87, 89, 103 X

20. We need a hot evening drink.

a) The evening was hot.

b) The drink was hot.

L_1 4, 26, 7 / L_2 26, 66, 137 /

21. He tripped over a red paint pot.

a) The pot was a red in colour.

b) The paint in the pot was red.

L_1 31, 4, 2 / L_2 70, 77, 82 °

22. He watched the dancing girl carefully.

a) The girl was dancing.

b) The girl is a dancer.

L_1 29, 3, 5 / L_2 103, 50, 76 /

23. I admire his new captain's uniform.

a) His new captain had a uniform.

b) It was a new uniform. The uniform was for a captain.

L_1 15, 15, 7 ° L_2 45, 105, 75 X

24. I saw him inside the dark green house.

a) The house was painted dark green.

b) The green house was dark.

L_1 3, 31, 3 / L_2 66, 100, 63 /

25. You would do a silly thing like that.

a) Only you would do such a silly thing and you have done it.

b) You might do it if you have a chance some day even though it is silly.

L_1 28, 2, 7 / L_2 54, 94, 81 X

26. They don't know how good meat tastes.

a) They have never tasted any meat at all.

b) They have only tasted bad meat.

L_1 3, 28, 6 / L_2 77, 69, 83 °

27. I'm always glad to meet a nice man.

a) A man who is nice.

b) A man who sells ice (or ice cream).

L_1 34, 0, 3 / L_2 142, 15, 72 /

28. I have a son Tau who is a doctor.

a) Tau is the name of the person being spoken to.

b) Tau is the name of the son, who is a doctor.

L_1 0, 33, 4 / L_2 8, 194, 27 /

29. It's hot today, isn't it?

a) "Isn't it?" means "You agree with me, don't you?"

b) "Isn't it?" means "Please tell me".

L_1 32, 2, 3 / L_2 154, 26, 49 /

30. I intend to read this paper carefully. He can sign it when I've done so.

a) "I've done so" means after I've signed the paper.

b) "I've done so" means after I've read the paper.

L_1 1, 34, 2 / L_2 33, 127, 69 /

PART II

31. We bought two hundred year old houses.

(2) a) The houses are one year old. There are two hundred of them.

(1) b) The houses are one hundred years old. There are two of them.

(3) c) There are a number of houses. They are two hundred years old.

L_1 a) - a) 32, b) 0, c) 5, Z) 0 / L_2 a) 77, b) 27, c) 82, Z) 23 °
b) - a) 1, b) 35, c) 0, Z) 1 / L_2 a) 18, b) 120, c) 52, Z) 19 /
c) - a) 5, b) 1, c) 27, Z) 4 / L_2 a) 48, b) 27, c) 103, Z) 31 /

32. John gave Mary a banana at the market today.
(In each case the subject must decide which question the test sentence is answering.)

(2) a) Where did John give Mary a banana today?

(1) b) Who gave Mary a banana?

(4) c) Who did John give the banana to?

(5) d) What did John give Mary today?

(3) e) When did John give Mary the banana?

L_1 a) - a) 13, b) 4, c) 2, d) 0, 3) 15, Z) 3 °
b) - a) 13, b) 17, c) 0, d) 1, e) 2, Z) 4 °
c) - a) 1, b) 2, c) 33, d) 0, e) 0, Z) 1 /
d) - a) 2, b) 0, c) 0, d) 33, e) 1, Z) 1 /
e) - a) 1, b) 2, c) 1, d) 2, e) 29, Z) 2 /

L_2 a) a) 62, b) 25, c) 25, d) 41, e) 41, Z) 15 °
b) a) 90, b) 41, c(18, d) 23, e) 24, Z) 13 X
c) a) 27, b) 31, c) 80, d) 25, e) 29, Z) 17 /
d) a) 34, b) 38, c) 23, d) 71, e) 26, Z) 17 °
e) a) 26, b) 36, c) 35, d) 28, e) 61, Z) 23 °

33. "The boss is getting a new secretary." "Who?"
(The subject decides upon the appropriate continuation of the dialogue.)

(2) a) The boss.

(1) b) Mary Smith.

L_1 a) - a) 36, b) 1, Z) 0 /
b) - a) 1, b) 36, Z) 0 /

L_2 a) 119, b) 70, c) 20 /
a) 53, b) 139, c) 12 /

34. "Where were you born?" "Port Moresby." "Where?"
(Answered as for 33).

(1) a) Port Moresby.

(2) b) Hanuabada.

L_1 a) - a) 36, b) 1, Z) 0 /
b) - a) 1, b) 35, Z) 1 /

L_2 a) 89, b) 115, Z) 5 X
a) 74, b) 116, Z) 19 /

35. "Ask your friend to come inside."
(The subject is asked to judge degrees of politeness.)

(3) a) polite

(1) b) a request

(2) c) a command

L_1 a) - a) 20, b) 12, c) 2, Z) 3 /
b) - a) 3, b) 12, c) 11, Z) 1 °
c) - a) 13, b) 7, c) 14, Z) 3 °

L_2 a) 81, b) 56, c) 63, Z) 9 °
a) 55, b) 60, c) 76, Z) 18 °
a) 57, b) 80, c) 68, Z) 4 X

36. "It's not bad."
(The subject is asked to judge emotive 'overtones'.)

(1) a) It is good.

(4) b) It is satisfactory.

(3) c) It isn't very good.

(2) d) Some people think it is satisfactory, but I think it is awful.

L_1 a) - a) 32, b) 1, c) 1, d) 1, Z) 2 /
b) - a) 4, b) 22, c) 3, d) 4, Z) 4 /
c) - a) 0, b) 8, c) 24, d) 3, Z) 2 /
d) - a) 3, b) 16, c) 4, d) 6, Z) 8 X

L_2 a) 72, b) 63, c) 37, d) 28, Z) 9 °
a) 39, b) 32, c) 36, d) 61, Z) 41 X
a) 37, b) 43, c) 54, d) 46, Z) 29 °
a) 51, b) 63, c) 59, d) 18, Z) 18 X

37. "Yes".
(Answered as for 36.)

(2) a) I agree.

(1) b) Go on.

(3) c) You can't really mean "Yes?"

(4) d) I'm doubtful.

L_1 a) - a) 36, b) 0, c) 0, d) 0, Z) 1 / b) - a) 0, b) 34, c) 0, d) 2, Z) 1 / c) - a) 0, b) 1, c) 35, d) 0, Z) 1 / d) - a) 0. b)2, c) 0, d) 35, Z) 0 /

L_2 a) 126, b) 41, c)7, d) 24, Z) 11 / a) 36, b) 89, c) 39, d) 32, Z)13 o a) 27, b) 45, c) 77, d) 46, Z)14 o a) 11, b) 28, c) 60, d) 98, Z)12 o

The response of L_1 and L_2 subjects to the test items in Part I and Part II is summarized below.

PART I

L_1 Trend	
As predicted	24
Not significant	3
Against prediction	3
Total	30

L_2 Trend	
As predicted	11
Not significant	5
Against prediction	14
	30

PART II

L_1 Trend	
As predicted	18
Not significant	4
Against prediction	1
Total	23

L_2 Trend	
As predicted	7
Not significant	11
Against prediction	5
	23

DISCUSSION OF THE RESULTS

As the summary of results (above) shows, L_1 speakers showed a highly significant tendency to select the predicted paraphrase, though as expected, the S.R.I. cues operated in terms of probability and not certainty. It would have been reasonable to expect L_2 speakers' responses to be in line with these probabilities, though at a less significant level then L_1 speakers. In fact, the L_2 speakers' responses approximate rather to random-choice behaviour, with as many predicted paraphrases being selected as non-predicted, and almost as many items showing no particular pattern of choice.

The argument was put forward earlier that in order to make a choice it is necessary for the listener in some sense to contextualize the utterance he has heard. In this test two contexts were in effect provided and the listener had to choose between them. L_2 listeners clearly found this harder than L_1 listeners. Perhaps this fact can be accounted for in terms of reading comprehension, though at the level of education reached by the subjects, this seems unlikely. A possible explanation is that classroom language learning tends to be decontextualized, particularly in the case of drill work on S.R.I. which is almost invariably divorced from meaning.

Overall the experimental evidence shows that there is a system of stress, rhythm and intonation in English, that this system does effectively cue the languages responses of L_1 speakers, and that L_2 speakers with a minimum of ten years of English medium education have little or no mastery of that system.

Comments on Test Items

The major problem encountered by L_1 subjects seems to have been to distinguish between contrastive or emphatic stress marking the 'information point' and an S.R.I. pattern cuing underlying structure. In a number of items (see below), identifying the S.R.I. pattern as contrastive leads to the non-predicted choice. Nevertheless L_1 speakers in this situation made the overall assumption (by confirming the predictions) that the main function of the S.R.I. pattern is to indicate underlying structure.

Item 3

More L_1 subjects than L_2 recognized the significance of the S.R.I. pattern, but both groups went against prediction. The stress on 'any' could easily be considered emphatic within context (a).

Item 4

The only item for which L_2 subjects reacted as predicted while L_1 speakers reacted against prediction. Again the cue utterance could easily have been interpreted by L_1 subjects as emphatic. Some L_2 speakers might not know the use of 'pretty' as an intensifier. It is difficult to assess the importance of such semantic variables in several items. In theory, subjects should have made no choice if confused in this way.

Item 6

The only other item where L_2 speakers responded more in accordance with prediction than L_1 speakers.

Items 10 and 12

Both test sentences allow a strong possibility of contrastive stress e.g. "amusing them not annoying them" of "An English teacher not a Frenchman".

Items 17 and 18

It is tempting to assume here that Item 17 was badly presented since the underlying structures of 17 and 18 are identical and L_1 subjects responded as predicted to Item 18, if not decisively.

Item 30

Item 30 tests S.R.I. patterns in discourse rather than at sentence level. It is interesting that L_2 subjects responded here as predicted.

Item 35

The test item was a poor one since tone of voice (kept neutral here) seems to be at least as important as S.R.I. pattern.

Items 36 and 37

Since these items tested affective response and were given out of context, L_1 subjects performed perhaps surprisingly well. For 7 of the 8 responses by L_2 subjects, more than half were uncertain or made their choice against prediction, a disturbing result when one considers how much a teacher depends on the pupil understanding the precise shades of meaning implied in the way he says "Yes", or "It's not bad". This result suggests too that contextualized learning is not always effective, since the L_2 subjects have been for many years in communication situations involving the meaningful interpretation of such expressions.

SOME PEDAGOGICAL IMPLICATIONS

Since de Saussure, linguists have been generally in agreement that language is a system of relationships. This assumption is made here in its strongest form: that every item in a sub-system of the phonological, syntactic or semantic components exists in terms of its relationship to all other items in the sub-system, that each sub-system is related to all other sub-systems of the component, and that the components are similarly related to each other.

It follows from this assumption that effective language learning associated with a particular item of a particular sub-system must affect all items within the total language system to a greater or lesser extent. George Miller has shown the impossibility of the task of first language acquisition on the basis of necessarily fragmentary data if this were not the case. (11)

The language learning experience of the L_2 subjects of the experiment reported above was apparently not effective and in terms of the argument presented above, their learning was ineffective because their work on S.R.I. was discrete, the patterns being practised in isolation and in relation only to themselves.

---

(11) Miller, George A: "Some Preliminaries to Psycholinguistics" in the Psychology of Language, Thought, and Instruction, Ed. John P. de Cecco. Holt, Rinehart, and Winston, 1969, p. 345.

John Macnamara bases the following remarks on studies of both L_1 and L_2 acquisition: "A person's language learning abilities are brought into play only when he is either trying to make out what someone is saying to him in the new language or trying to tell someone something in that language". (12)

A. Bruce Gaarder is similarly convinced that the learner's attention must be directed "beyond drills from the beginning and fixed constantly on the meaning and reality of his life experiences in the new language, however verbal and vicarious this may be". (13)

These points with regard to the nature of both language and learning were summed up by John Carroll in 1966 as being well established if poorly implimented tenets of learning theory:

> "1) The frequency with which an item is practiced per se is not so crucial as the frequency with which it is contrasted with other items with which it may be confused.
>
> 2) The more meaningful the material to be learned, the greater the facility in learning and retention." (14)

If these arguments are accepted, they suggest that the experimental technique used here can be adapted to provide radically improved teaching materials for S.R.I.; materials which will contrast related items within the phonological component and express the relationship of these items with the syntactic and semantic components, and which will express these relationships by reference to different contexts and meanings. It must be admitted that not all S.R.I. patterns are amenable to meaningfully contrastive presentation, but I would like to suggest that those rules or probabilities which are not dependent on meaning contrasts, or seem not to be, are in fact the by-products of the language acquisition devise, the rule-making mechanism, and are largely dependent upon and shaped by those rules which are based on meaningful distinctions. If this is so, then many of the traditional criteria for the selection of teaching materials, such as frequency and utility, become less highly valued than the search for crucial instances where clearly definable meaning differences can be established: where by taking care of the sense, the sounds take care of themselves.

---

(12) Macnamara, John: "The Cognitive Strategies of Language Learning", reported in and quoted from Languages in American Indian Education Winter 1972 Ed. William R. Slater, University of Utah.

(13) Gaarder, A. Bruce: "Beyond Grammar and Beyong Drills", Foreign Language Annals I., 1967, pp. 109-118.

(14) Carroll, John: "The Contributions of Psychological Theory and Educational Research to the Teaching of Foreign Languages", in Albert Valdman (Ed.) Trends in Language Teaching N.Y. McGraw Hill, 1966, pp. 104-105.

THE EFFECT OF LANGUAGE CODES IN THE HOME AND MATERNAL TEACHING STYLES ON THE LANGUAGE DEVELOPMENT OF THE PRESCHOOL CHILD

Timothy A. Awoniyi, University of Ibadan, Nigeria

A review of the literature shows that much doubts still exist on how children acquire language particularly in the traditional African societies.

Nevertheless, in almost all societies, interests, sometimes bordering on over-enthusiasm, had been shown on how children acquire language. For instance, Psammetichus, an Egyptian king of about the seventh century B.C. held that he would determine the most ancient language by the first language code uttered by the child. Marooning an innocent child, with a shepherd, in solitary confinement, the king was told that after two years, the child was constantly repeating "bekos" which in Phrygian meant bread. That led him to the surprising conclusion that the language Phrygian was the world's original tongue, Crystal (1971).1 The Holy Roman Emperor, Fredrick II of Hohenstaufen (d. 1250) made similar experiments, though the children died without results. All these and similar other experiments including that of James IV of Scotland are no more than curious speculation on the first utterance of the child. But subtly underlying them is the assumption that language acquisition was innate.

Perhaps, the first well known pioneering efforts at systematically investigating the language development of the child were those of Darwin (1877).2 He compiled a record of the language of his own son and got it published in 1840. But no sooner systematic studies began, that the dynamism became born of controversy on the theoretical rationale under-lying children's language development. In 1908, for instance, Stern (1908)3 proposed the principle of "convergence", that is, that language learning takes place by the interaction between what drive (Sprachdrang) that comes from the child and what factors come from the environment. The theory was later intensively and extensively assessed leading to a swing of the pendulum by scholars to two extremes - the Nativists and the Behaviourists.

The Behaviourists were immensely influenced by the studies of Pavlov (1927)4 in Russia, and Skinner (1957)5 in the U.S.A. To the behaviourists, language acquisition, like any other human habit, is based on stimulus and response. Though emphasis was put on the influence of the environment, they did not deny cognitive potentialities, Sapon (1968).6

Almost simultaneously, Chomsky (1965)7 set ripples on the linguistic scene by his assertion that cognitive potentialities are much more crucial in children's language learning than the stimulus from the environment. He was soon to have ardent supporters, including Lenneberg (1967)8, all of them asserting amongst others that:

(a) There is innate disposition in the child for linguistic acquisition.

(b) Children are capable of generating from primary to deep structures in their language.

(c) Imitation (i.e. habit formation) in language learning by children is subsidiary, for imitation itself has to be learnt.

(d) Children are essentially creative and capable of setting out their own linguistic hypothesis - testing it; redefining it; or rejecting it; as the occasion may warrant.

However, in spite of ensuing controversy on which takes priority - cognition or environment - increasing number of scholars hold the view that the child's family exerts the strongest influence. But speculation arises as to the variables most significant in the family. McCarthy (1953)9 asserts that a slight sex-difference in the children studied should be attributable to a closer mother-daughter than father-son relationship. Noel (1953)10 who studied language usage of 177 children and their parents came to the conclusion that the language an elementary school child hears from his parents determines the quality of his own. Stodolsky (1965)11 asserts that both the quality of the mother's language and her teaching styles contribute to her child's linguistic development. Lesser, et al12 claimed that middle class Jewish children excelled in verbal skills because of linguistic emphasis in Jewish homes. As early as 18 months, according to Irwin (1948)13, working class children's frequency and sound production improved with telling them stories at home. In fact, Rheingold (1959), (1963)14, 15 claims that as early as 3 months, reinforcement in the home increases the sound production of children.

The study is therefore designed to find out to what extent the traditional background of the Nigerian child (C-5 years) affects his linguistic development.

Method of Investigation

Eighty two mothers and their children (families) were sampled and these were considered fairly representative of the following variables: Socio-economic background, urban-rural location, family size and occupational status. One of the mothers had identical female twins. The age range of the children studied was 0-5 years. Some of the methods used include:

(a) Systematic observations of mother-child interaction for a period of $1\frac{1}{2}$ years.

(b) Systematic interview and printed questionnaire on methods of child rearing in the traditional homes.

(c) Tape recording and note taking of the language codes of parents and children involved in the study.

The writer is aware that a study such as this having limitations for language is closely related to other variables such as thinking, memory, conceptualization, intelligence and so on that it is difficult, if not impossible to separate linguistic achievements from the total development of the child.

Be that as it may, the writer is of the opinion that language and culture are intricately interwoven. Indeed, language is the manifestation of culture. Hence cultural attitudes have implications for learning. The overwhelming evidence from this study reinforces this feeling that the extended family system in Africa furnishes the child with varying language models, and actively

supported by organized material teaching styles.

Findings

This study, based on the sampled Yoruba families has led us to some interesting conclusions:

(i) The Yoruba extended family system provided the child with a variety of learning situations and emotional security. The diffusion of care for the child amongst several members of the family and the particular responsibility of the mother contribute to the rapid linguistic development found in the children studied.

(ii) We found that there was direct and specific material intervention by mothers on the linguistic training of their child. To the Yoruba mother, language is more than speaking and listening. It includes all forms of human interaction in which a person is made aware of a thought, feeling, on question experienced by another person. Over 80% of the mothers interviewed were of the opinion that "the odour of the maternal body", (for children are put at the back of the mother to appease the child when angry) and the continuous suckling are essential elements of language training. A mother puts it this way: "Without personal and affectionate security, you cannot talk properly, or know what to say".

(iii) Though it is generally believed that crying is the commonest form of early practice with the vocal organs, it is found that a majority of Yoruba mothers particularly induced their children to cry, and children were left to cry perpetually for a long time, before mothers come to appease them. One finds it difficult to understand this apparent 'cruelty' until one analyses the immense data on crying as an indispensable form of language amongst the Yorubas. Crying by adults is common in Yorubaland and it is a cultural manifestation of a tragedy and the style varies as to the event. There are symbolic cryings and real cryings. Majority of the Yoruba children interviewed claimed that "crying makes a child healthy and to be a good speaker as an adult". They put in a proverb thus "omo ti yio ba je asamu, kekere ni won ti se enu samusamu" (Trans. "a youth who is going to be sharp will be clear and precise in his speech/crying from childhood".

(iv) Linguistic features of children studied and maternal teaching styles:

Some mothers interviewed and observed claimed that they were able to determine the significance and meanings of early sounds of their children. A particular mother claims to be able to distinguish three distinct cried (i.e. of pain, of hunger, of 'desertion') of her 3-month old child when at a distance to the child. She claimed to do this by variations noted in the pitch, intensity, and style of the child's crying and sounds.

In very many instances, the investigator and his collaborators were surprised that mothers actually talked to their children between 1-6 months as if they talk to adults. These Yoruba mothers insisted that their children "heard" them. One mother declared: "words spoken to children are not lost, they internalize with them, go into their subconscious selves, to be made use of later". Hence, in Yoruba culture, direct teaching of tribal moves and norms, customs and traditions by mothers begin at birth.

(v) Also, it is interesting enough that a number of the children studied, as analysed by their tape recorded sounds, began oral-aural discrimination of tones very early, most of them at about six months. Yoruba is a tone language and tone is phonemic. They had started to verbalize at nine months though verbal labels are semantically and syntactically related. It is strange that most of the children encountered say "je je je" (i.e. eat eat eat) to mean "food". But there were a number of children who mixed up tones and so it is not very clear at what stage of development Yoruba children actually perceive tones. One child (born 11.4.1972) and at 2 years, still persists in saying baba (for father) rather than the correct form - baba or Baba. But the same child says Mo bubu (I fall down) with correct tonal features, though he used bubu for subu. In grammatical structures, many of the children studied use Mo (Pronoun, I) with verbal elements e.g. Mo bubu (I fall down), but O (2nd person pronoun, he/she/it) for themselves in all other cases, e.g. O too (I urinate), O sun ('I' want to sleep). It is the mother who intervenes in correcting these anomalous grammatical constructions.

The study shows that the extent, the nature, and the direction of language stimulation in the home and the community reflect the interplay of many factors which affect the Yoruba child. This study, though not in any way conclusive, nevertheless indicates certain directions in which further studies may be necessary.

REFERENCES

1. As reported in Crystal, D: Linguistics, Middlesex, Penguin Books Ltd., 1971.

2. Darwin, C: The Biography of an Infant, Mind. II, 1877.

3. Stern, William S: Kindersprache, Leipzig, J.A. Barth, 1908.

4. Pavlov, I.P: Conditioned Reflexes, trans. G.V. Anrep, 1927.

5. Skinner, B.F: Verbal Behaviour, Appleton - Century - Crofts, 1957.

6. Sapon, S: Engineering Verbal Behaviour, Paper presented at the Conference on Problems in the Teaching of Young Children, March, 1968.

7. Chomsky, M: Aspects of the Theory of Syntax, Cambridge, Mass., MIT Press, 1965.

8. Lenneberg, E.H: Biological Foundations of Language, N.Y., John Wiley & Sons, 1967.

9. McCarthy, Dorothea: Some possible explanations of sex differences in language

10. Noel, Doris I: A comparative study of the relationship between the quality of the child's language usage and the quality and types of language used in the home. Journal of Educational Research 47: pp. 161-167, 1953.

11. Stodolsky, S: Maternal Behaviour and Language and Concept Formation in Negro PreSchool Children: An Inquiry into Process. Unpublished Ph.D. Dissertation, University of Chicago, 1965.

12. Lesser et al: Mental Abilities of Children from Different Social-Class and Cultural Groups. Monographs of the Society for Research in Child Development, XXX No. 4, serial No. 102.

13. Irwin, O: Infant Speech: The Effect of Family Occupational Status and of Age on the Use of Sound Types. Journal of Speech and Hearing Disorders, XIII pp. 224-226, 1948.

14. Rheingold, H, et al: Social Conditioning of Vocalizations in the Infant. Journal of Comparative and Physiological Psychology, LII, pp. 68-73, 1959.

15. Rheingold, H: Controlling the Infants' Exploratory Behaviour. In Determinants of Infant Behaviour II: pp. 171-178, Foss, B.M.(Ed.), N.Y. John Wiley, 1963.

BILINGUAL EDUCATION AND TEACHER TRAINING IN PAPUA NEW GUINEA

R K Johnson
Teaching Methods and Materials Centre, Faculty of Education
University of Papua New Guinea

This is a report on student attitudes following a seven week experimental programme in Vernacular Literacy conducted at the Port Moresby Teachers' College in 1st Semester 1975.

Government and Ministry policy in Papua New Guinea in the past few years has placed much greater emphasis on the community orientation of education at all levels, but particularly at the level of primary education. One proposed policy change which will help to bring about this orientation concerns language policy, and establishes as a long term goal a situation in which the language of education in the early years of school should be the functional language of the community which the school serves. If this policy is adopted by the government, the Ministry of Education will face many problems in implementing it. Amongst these are crucial issues such as the attitudes of teachers and the possibility of adapting the teacher training system to cater for the new policy. It is hoped therefore that this research will be of interest and value to those involved in policy planning and policy implementation, since no such person will be unaffected by the language issue. Some background details concerning the seven week course conducted at the Port Moresby Teachers' College are important, and are outlined below.

The two year teacher training programme at Port Moresby Teachers' College has in the past few years been increasingly orientated towards a community approach. A number of lecturers within the college have become increasingly convinced that community orientation, or community service is only possible in terms of the culture of a community as expressed through its language. As a step in this direction, last year approximately twenty students from the college attended a Pidgin Literacy workshop organized by the Language Department, University of Papua New Guinea, in conjunction with the Summer Institute of Linguistics. This two week course resulted in a considerable demand from students for further opportunities of this kind. Taoripi students from the college had also begun a community service programme with the Taoripi community in Port Moresby, a programme which is continuing. Nevertheless, the lecturers concerned felt that such ad hoc measures were inadequate in view of what they saw as the fundamental importance of the issue. They therefore worked to have a vernacular literacy programme included in the core programme of the college: that is, the skills of teaching reading and writing in the pupils' mother tongue, or in Pidgin or Hiri Motu where these languages are spoken, and a basic introduction to the concepts of bilingual education in general were to be included in a basic skills programme to be taken compulsory by all students at the college.

This proposal was accepted by the college, though reservations were expressed by some members of staff, and there was some opposition.

The course content was organized by two members of the Summer Institute of Linguistics, specialists in vernacular literacy work, who were seconded to the college for this purpose. The bulk of the teaching however,

was done by college lecturers. The course was conducted in the early weeks as a basic lecture programme, with a greater emphasis on practical work in the latter part of the seven week programme. Each week there were three one hour lectures for students at the college and three one hour seminars for staff members teaching the course. For each one hour Unit, a Summer Institute of Linguistics member would teach one group of students, and this session was attended by college staff involved in the course. This session would be followed by a seminar in which the lecturers would discuss the unit with the Summer Institute of Linguistics members. Lecturers would then teach the unit to other students. Under the circumstances, i.e. lecturers already were carrying a full teaching load, this was all the preparation that was possible, but it will be recognized that such a lack of adequate preparation is undesirable, and might have been expected to have an adverse effect on the teaching situation.

The unfavourable circumstances under which the course was conducted should be emphasised: it was an experimental programme being conducted for the first time by staff who were enthusiastic, but in other respects ill-prepared for their task. The Summer Institute of Linguistics members, though experts in their field, had no experience of teacher training, or educational qualifications as such. The Teachers College lecturers, though experts in various aspects of teacher education had no experience or expertise in bilingual education or vernacular literacy. It is certain then that future courses will benefit greatly from the experience gained in this one, and that many aspects of such courses will be modified in the light of this experience.

Experimental programmes often benefit from the motivation generated by new content and staff enthusiasm: the Hawthorne effect. However, owing to timetabling difficulties, the vernacular literacy programme had to be taught during an afternoon period which had been free time for students in previous years. Second year students showed some resentment towards the course for this reason. This resentment seemed to be dispelled later, and attendance at lectures was generally good, but there was no evidence to suggest a Hawthorne effect operating in this case.

The adverse circumstances under which the course was conducted are emphasised for two reasons: firstly because these difficulties were very real and produced some doubts in the college and elsewhere as to the value of the programme, and secondly because it is unlikely that ideal conditions for such a programme will exist in teachers colleges in Papua New Guinea for some years to come, and it is important to appreciate that what was done at Port Moresby Teachers' College was achieved under conditions very far from ideal, and which could be replicated, with improvements based on experience, by any other teachers college if Ministry of Education policy favours such a development.

THE QUESTIONNAIRE

Out of 203 1st year and 149 2nd year students at the College, all of whom took the vernacular literacy course, 173 1st year students and 100 2nd year students completed the questionnaire. Overall there was no marked difference between the responses of 1st and 2nd year students, though the latter had fewer internal contradictions in their responses (see next paragraph) and showed themselves to be somewhat more aware of the pedagogical advantages of mother tongue education than 1st year students.

Not all students responded to each question, and in some questions more than one response was permitted; thus the total number of responses varies from question to question. Some questions were designed to test the

consistency of students' responses, e.g. where 'yes' for question (Y) precludes an answer of 'Yes' for question (Z). Overall there was a high level of consistency in the responses, but where inconsistencies arose, they are noted below. One other general feature is worth mentioning: students obviously preferred to make a positive response: that is approximately 10% more respondents would mark 'Yes' or 'True' for item (Y) than would mark 'No' or 'False' for item (Z), when the meanings of Y and Z were opposite.

The items in the questionnaire are set out below with the numbers of responses showing 1st year, 2nd year and overall totals. Comments are added on points raised which may be of interest.

1. Do you think Papua New Guinea should introduce some form of bilingual education?

1st year		137		4		20
2nd year	Yes	88	No	3	Uncertain	8
Total		225		7		28

Informal discussions with Port Moresby Teachers College students in second semester 1974 suggested to me that opinion for and against English as the sole medium of instruction was farily evenly divided, with the more articulate students favouring English. This strong response in favour of some form of bilingual education is surprising and suggests that the course had an effect in changing student attitudes to language policy. (See items 8, 9, 10 and 11 for some evidence of the influence of the course on student attitudes).

2. What language or languages should be used during the first two or three years of primary education? (You may tick more than one box)

		1st	2nd	Total
(a)	only English	35	18	53
(b)	mother tongue and English	102	60	162
(c)	mother tongue and Hiri Motu or Pidgin (where Hiri Motu or Pidgin are known)	55	39	94
(d)	only mother tongue	12	10	22
(e)	English and Pidgin or Hiri Motu (where the students speak different mother tongues)	95	57	152

I. The responses to item 2a showed some internal inconsistency in that approximately 1/3 of the total of 53 who showed that they favoured a policy of English only, also placed a tick elsewhere indicating other languages should be used either as well as or in place of English.

II. The favoured policy is that of mother tongue and English, or, where the mother tongue is impracticable, English and the appropriate lingua franca (i.e. the lingua franca commonly spoken in that area).

III. The very small number of students marking option (d) is of considerable significance. The advantages of beginning education in the mother tongue, and introducing other languages later, was a major point in the teaching programme. This response therefore indicates that the students were not

'brainwashed' or simply replying as they believed their lecturers wanted them to reply. If either of these had been the case, option (d) would have received far more support. This response suggests the rejection by the students of any monolingual approach, a suggestion which is strengthened by the response to item 3.

3. (a) In areas where children do not speak Pidgin or Hiri Motu, should children learn one of these languages?

1st year		141		17			9
2nd year	Yes	75	No	18	Uncertain		5
Total		216		35			14

(b) If your answer was 'Yes', when should the language be taught? (You may tick more than one box)

		1st	2nd	Total
(a)	from the beginning of primary school	117	62	179
(b)	before leaving primary school	42	27	69
(c)	at secondary level	41	21	62
(d)	at tertiary level	24	10	34

The overall response to items 1, 2 and 3 suggests a language policy by which the mother tongue, a lingua franca and English would all be taught or used from the beginning of Class 1. Such a policy would not be practicable or educationally sound, but the important point which is confirmed here is the multi-lingual orientation of the students, and their rejection of a monolingual approach whether in relation to English or a vernacular language.

4. Do you think you would enjoy using your mother tongue in your teaching?

(a) if materials were available in your mother tongue.

1st year		168		10			8
2nd year	Yes	83	No	3	Uncertain		11
Total		251		13			19

(b) if your information had to come from materials written in English.

1st year		94		28			23
2nd year	Yes	50	No	22	Uncertain		14
Total		144		50			37

5. Do you think you would enjoy teaching in your home village or community?

1st year		133		16			15
2nd year	Yes	84	No	6	Uncertain		7
Total		217		22			22

The responses to Items 4 (a) and (b) and 5 are of considerable

significance for policy planners concerned to introduce a bilingual education programme and concerned to make education in Papua New Guinea more community orientated. The responses show:

I. That the idea of teaching through the medium of their mother tongue appeals to the great majority of students, and that more than half of the students believe that the mother tongue could be the medium of education even when there is no teaching programme for that language. (Given the large number of languages in Papua New Guinea, and the limited resources, it is almost certain that teachers would have to rely on materials written in English for planning their mother tongue education programme.) Even more significant perhaps is the very high proportion of students who regard favourably the prospect of teaching in their home village or community. This is not the case in many developing countries where teachers and public servants often prefer to work in areas where they can escape what they see as the intolerable demands of an extended family. This evidence is therefore welcome and heartening in that such attitudes would facilitate implementation of the kinds of policy decision now under consideration.

Items 6 and 7 are concerned with responses to a set of statements. The responses to 6 and 7 are therefore presented together.

6. Consider the following statements about bilingual education, and decide whether you think each one is true or untrue.

7. Choose the three statements from question 6, a-m, which you agree with most strongly.

   (a) Write down the letters of these statements.

   (b) Choose the statement you think is most important.

(a) Bilingual education will improve communication between teacher and pupil.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	133	12	18	67	18
2nd year	89	4	7	52	18
Total	222	16	25	119	36

(b) Bilingual education will improve communication between the school and the local community.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	151	7	15	73	26
2nd year	87	5	8	35	11
Total	238	12	23	108	37

(c) Bilingual education makes it harder for the child to learn English.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	13	134	18	9	2
2nd year	14	70	16	3	-
Total	27	204	34	12	2

(d) Bilingual education makes it easier to bring local cultural activities into the school.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	127	18	20	43	11
2nd year	87	9	4	31	7
Total	214	27	24	74	18

(e) The child is happier in a classroom where his mother tongue is used.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	130	6	27	29	2
2nd year	82	7	11	20	5
Total	212	13	38	49	7

(f) The child will contribute more to the lessons by speaking, asking questions discussion etc. in a bilingual classroom.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	132	13	21	54	22
2nd year	82	6	6	34	13
Total	214	19	27	88	35

(g) Young children in the village will understand subject matter better in the mother tongue.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	137	13	9	33	11
2nd year	89	2	9	33	4
Total	226	15	18	66	15

(h) Young children in the village will understand subject matter better through English than through the mother tongue.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	11	91	39	6	2
2nd year	16	66	18	4	-
Total	27	157	57	10	2

(i) The child will learn to read and write more quickly and more effectively in the mother tongue.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	107	24	32	43	12
2nd year	66	12	21	25	8
Total	173	36	53	68	20

(j) Learning to read and write the mother tongue makes it harder to learn to read and write English later.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	33	98	31	9	1
2nd year	21	52	25	2	2
Total	54	150	56	11	3

(k) Learning to read and write the mother tongue makes it easier to learn to read and write English later.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	114	21	24	49	34
2nd year	61	17	21	23	13
Total	175	38	45	72	47

(l) Beginning education in the mother tongue will help the pupil to learn English.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	120	25	16	25	13
2nd year	75	17	9	12	6
Total	195	42	25	37	19

(m) Bilingual education would be bad for Papua New Guinea.

	ITEM 6			ITEM 7	
	True	False	Uncertain	a	b
1st year	12	137	24	3	1
2nd year	7	74	17	3	2
Total	19	211	41	6	3

The responses to item 6 show some inconsistency: e.g. 6(m) showed more students to be uncertain or against bilingual education than there were in the responses to itemI. (There was also a difference - 273 to 260 - in the number of responses recorded). Items (g) and (h), and (j) and (k) show a similar inconsistency when contrasted. In each case the tendency seems to have been for students who marked 'True' in one instance to be reluctant to make the opposed statement 'False', and therefore mark themselves 'Uncertain'.

The importance students attach to the learning of English is clearly shown in the numbers who chose (K) and (L) as the 'most important' statement. (47 and 19 respectively). The number choosing (K) was the highest for any single statement. The main consideration of students however seems to have been the classroom itself: communication within the classroom and the learning situation in general. Items (a), (g), (f) and (i) can be identified under this heading, and these received a total of 106 responses indicating the most important statement (7b).

A third category might be described as social and cultural benefits, and includes (b) and (d). These received a total of 55 responses.

Overall, nine statements could be supported by those who favoured a bilingual approach. Of these nine, statement (e) 'The child is happier in a classroom where his mother tongue is used' was ranked ninth both in responses to (7a) and (7b).

There were also a few inconsistencies between the responses to (7a) and (b) and responses to (6), where students had identified as statements that they agreed with strongly or as important, statements which they had marked as false. It may be that they wished to emphasise the falseness of this statement. The total number of such responses was 15, distributed as follows: c - 4; e - 1; g - 1; i - 3 (7a) 2(7b); j - 1; m - 3. With the exception of (i) all such inconsistencies related to (7a).

Items 8 - 11 attempted to establish the influence on student attitudes that the course had had. A pre-test and post-test would have been more valuable, but unfortunately no pre-test was conducted. However, the results gained from these items give some indications.

8. As a result of this course do you have more confidence, less confidence, or the same opinion regarding the importance of Papua New Guinea vernacular languages for PNG's future development?

	More Confidence	Less Confidence	Same Opinion
1st year	97	15	47
2nd year	71	3	19
Total	168	18	66

9. As a result of this course do you have more confidence, less confidence or the same opinion regarding the use of the mother tongue in the classroom?

	More Confidence	Less Confidence	Same Opinion
1st year	99	37	28
2nd year	72	11	11
Total	171	48	39

10. Do you have more confidence, less confidence or the same opinion regarding the use of the mother tongue as the language for learning?

1st year	More	77	Less	49	Same	31
2nd year	Confidence	57	Confidence	19	Opinion	17
Total		134		68		48

11. Do you have more confidence, less confidence or the same opinion regarding the value of reading and writing for your own language community outside the school?

1st year	More	102	Less	31	Same	19
2nd year	Confidence	62	Confidence	17	Opinion	15
Total		164		48		34

In general, the attitudes of the majority have been affected by the course (approximately 5/6) and the majority of these now feel more confidence in the role of vernacular languages in Papua New Guinean life in general and education in particular. A significant minority however express themselves as less confident in this role as a result of the course; an interesting result, since most of those respondents are in favour of bilingual education. It is only possible to speculate on the reasons, but a possibility is that the course showed some students, who had previously favoured bilingual education, that there are many problems to be overcome in establishing such a system: problems which previously had not occurred to them

The main practical purpose of the course was to train the students how to use prepared materials to teach literacy in their mother tongue and/or a lingua franca. Items 12, 13 and 14 show how far students felt this objective was achieved.

12. Do you feel confident that you could use prepared materials to teach reading in your own language?

1st year	Very	108	Fairly	41	Not	13
2nd year	Confident	53	Confident	34	Confident	6
Total		161		75		19

13. Do you feel confident that you could use prepared materials to teach reading in Pidgin or Hiri Motu?
(Tick only if you speak Pidgin or Hiri Motu fairly fluently).

1st year	Very	67	Fairly	46	Not	22
2nd year	Confident	44	Confident	31	Confident	16
Total		111		77		38

14. Do you have confidence in your ability to teach adults to read and write, using prepared materials?

1st year	Very	82	Fairly	55	Not	17
2nd year	Confident	57	Confident	26	Confident	9
Total		139		81		26

Most students have not yet had an opportunity to teach a literacy class, and the caution of the response of those students who were 'fairly confident' is therefore understandable.

The responses to item 15 could not be analysed owing to a mistake in the questionnaire.

Items 16 and 17 attempted to find out whether students' interest in bilingual education was sufficiently strong for them to want to do more study in this area, and whether students would be interested in teaching adult literacy in the communities they are eventually posted to as teachers. The responses to item 17 should be of particular interest to Adult Education Division.

15. Do you have confidence in your ability to prepare materials for teaching literacy?

16. Would you be interested in a further course to help you to make reading materials and books in your own language?

1st year	Very	97	Fairly	42	Not	18
2nd year	Interested	72	Interested	20	Interested	2
Total		169		62		20

17. Are you interested in starting adult literacy classes when you are posted as a teacher?

1st year	Very	83	Fairly	60	Not	14
2nd year	Interested	54	Interested	31	Interested	4
Total		137		91		18

The aim of item 15 was to test how realistic students' self assessment was: i.e. the course had not prepared them for such a task, and could not have attempted to do so in the time available. However, since this responses were under the headings 'Very Interested', 'Fairly Interested' and 'Not Interested' it is not possible to determine what the students had in mind for this item.

Items 18 (a) and (b) attempt to assess students' attitudes to the transfer of information and skills from one language medium to another.

18. Do you have confidence in your ability to express in your own language ideas you first learned in English?

(a)

1st year	Very	89	Fairly	50	Not	18
2nd year	Confident	54	Confident	35	Confident	5
Total		143		85		23

(b) Do you think you could express

1st year	All	19	Most Ideas	135	No Ideas	3
2nd year	Ideas	21		48		4
Total		40		183		7

Only a comparatively small number of students felt that all ideas could be transferred from English to the mother tongue. This seems a realistic assessment and adds to the impression given throughout that students were not simply sold the idea of bilingual education, but thought out their responses to the questionnaire carefully.

Items 19 - 21 consider the students' response to the course in terms of its value to them, and the potential value of such courses in other teachers colleges.

19. Do you think that a course like the one you have taken is helpful to teachers in training?

1st year		145		3		14
2nd year	Yes	93	No	2	Uncertain	6
Total		238		5		20

20. (a) Do you think all teachers colleges should have courses on bilingual education?

1st year		137		5		20
2nd year	Yes	94	No	2	Uncertain	6
Total		231		7		26

(b) If you answered 'Yes' to question 20, do you think the course should be:

Exactly like this one	1st year	2nd year	Total
	90	59	149
A little bit different from this one	1st year	2nd year	Total
	46	30	76
Altogether different from this one	1st year	2nd year	Total
	5	6	11

(A space is available at the end of the questionnaire for comments)

21. If bilingual education is introduced into the PNG education system, what changes, if any, would be needed in teacher-training colleges?

No changes	1st year	11
	2nd year	7
	Total	18

Special courses on bilingual education should be added to present course.

1st year	106
2nd year	73
Total	179

Big changes would be necessary for Primary Teacher-Training courses

1st year	42
2nd year	15
Total	57

The responses to these items amount to an overwhelming vote of confidence from the students for the idea of courses in bilingual education in teacher colleges and in the value to themselves of the particular course that they had taken.

The final item, 22, invited further comment on bilingual education in general or on this course. Most students wrote comments. The majority simply re-emphasised the points already made by their responses to the questionnaire, but among the responses which went somewhat further were the following:

- Special courses should be established for speakers of languages which have no orthography - (so that an orthography will be produced).

- Special scholarships should be granted for students to work on their own languages.

- A number of students felt that future courses should be longer to allow more time to be spent on teaching techniques and practical work. Other students asked for more time, or a separate course, on phonetics.

- Several students had noted the difficulties under which their lecturers were operating and suggested that specialist staff should be employed.

CONCLUSIONS

The following points emerged from the questionnaire.

1. Students are overwhelmingly in favour of a bilingual approach to education for Papua New Guinea.

2. The students expressed considerable interest in teaching through the medium of their mother tongue and the great majority are willing to teach in their home areas.

3. The students responses showed consistency and a reasoned response to the issues presented to them.

4. The great majority of students considered the course to have been of value to them, that similar courses should be offered in all Teachers Colleges, and that further courses and opportunities to specialise in vernacular education should be available.

5. Strong support was given for the teaching of Pidgin and Hiri Motu, as a medium of instruction in areas where a lingua franca is the functional language of the community, and as a second language in other areas.

Author's Note: Teacher Training If Bilingual Education is Introduced

The conclusions reached in this paper support the views of those who favour a bilingual education policy for Papua New Guinea, and suggest that the problems associated with teacher-training and posting are not so great as they might have been. However, if such policies are to be implemented successfully it will be necessary for the Ministry to appoint specialists in bilingual education to teachers colleges. Summer Institute of Linguistics staff members have shown their willingness to assist and hopefully will continue to do so, but in the long term there must be specialists appointed on a full-time basis who can help in re-orientating college programmes. (Unlike most of the students, I believe that radical changes will be necessary

in teacher training colleges if the new policies are put into operation). There must also be a training programme for Papua New Guinean officers who will assist the specialists in bilingual education and eventually take over from them. The basis for such a programme already exists in the Diploma in Language and Education, a one year full-time programme offered by the Department of Education (University of Papua New Guinea) in conjunction with the Department of Language and the Summer Institute of Linguistics. Diplomates of this programme could go into teachers colleges as assistant lecturers, and after two or three years could go abroad on UNESCO fellowships for further study. They should be capable of taking over the specialist posts in bilingual education by the early 1980's.

AN EVALUATION OF THE CURRICULA OF TEACHER EDUCATION PROGRAMMES OF BANGLADESH

Dr. Mazharul Haque
Institute of Education and Research, University of Dacca

The present study was an attempt to examine the relevance of the curricular offering of the teacher education programmes of Bangladesh, in order to identify the strengths and weaknesses of the programmes, the practices and the ideas and contents so that a rational basis for improvement of the curricula could be discovered.

The curricula of teacher education programmes offered by Primary Training Institutes (PTI), Colleges of Education, Teachers' Training Colleges, the Technical Teachers' Training College, and the Institute of Education and Research were included in the study.

OBJECTIVES

The main objectives of this study were:

(a) to evaluate the Teacher Education Programmes in order to determine their effectiveness in terms of their respective objectives;

(b) to suggest necessary measures for improvement on the basis of the evaluation.

In order to achieve these objectives the following questions needed to be answered:

1. What were the stated and implied Curriculum objectives of the teacher training institutions?

2. Did the stated objectives of the teacher education programmes serve the need of education of the country at different levels?

3. How far were these objectives being reflected in the content and instructional practices of the institutions under study?

4. How far were these objectives being realized by the teacher education programmes?

5. How far did the theories of teacher education programmes differ from their practices?

6. What would be the appropriate measures for improvement of the present teacher education programmes?

METHODOLOGY

The following methodology of research was used in order to determine the probable solutions for the problems involved:

1. Analysis of documents for description of the existing objectives of teacher education programmes.

2. Analysis of contents of syllabus, instructional materials, available research studies, prospectuses, annual reports, seminar reports and methods of instruction used.

3. Survey of teachers of teacher training programmes, trainees, graduates, and educational specialists for their opinions.

4. Analysis of facilities and practices in teacher training institutions and places of employment of graduates.

5. Analysis of international trends in curriculum practices (document and content analysis).

6. Trend analysis and projections.

DATA-GATHERING PROCEDURE AND INSTRUMENTS

Relevant documents and content materials, published and unpublished, were gathered from either publishers or other available sources. In the case of data concerning other relevant informations or opinions of people, efforts were made to gather them by personal interview. For personal interview such tools as schedules, questionnaires, opinionnaires, and inventories were developed and administered to respondents. While using the technique of personal visit and observation of practices and facilities, the observer used rating scales, schedules, and inventories.

An attempt was made to draw representative samples of respondents. An attempt was also made to prepare comprehensive data-gathering instruments so that each of them could be administered to several different types of respondents or could be used for a variety situations.

For the purposes of the survey of institutions and interviewing persons, the following instruments were used:

(1) Inventory of information on teacher education programmes.

(2) Questionnaire for teachers in teacher education institutions.

(3) Special questionnaires for: teachers of primary training institutes, colleges of education, technical teachers' training colleges, teachers' training colleges, and the Institute of Education and Research.

(4) Questionnaire for students, (graduates of teacher education programmes currently engaged in the teaching profession).

The members of the study team (faculty members of the Institute of Education and Research) and four field assistants (graduates of IER) specially

trained for the purpose worked as data-collectors by visiting 60 teacher education institutions and neighbouring schools, polytechnics and commercial institutes and interviewing 357 teacher educators, 832 graduates of teacher education programmes and the concerned officials in the teacher education institutions throughout the country in accordance with a specified sampling scheme and procedure for administering the instruments.

International comparison of educational programmes often provides significant criteria for evaluation of curricula and corresponding practices. In order to enrich the evaluative attempt as conceived in this study a comparative review of the curricula of the current teacher education programmes of India, U.K., U.S.S.R., U.S.A., Sweden, Cuba together with a brief description of those of Bangladesh was undertaken. It was thought that these programmes would represent the major systems of and trends in teacher education in the world.

MAJOR FINDINGS AND CONCLUSIONS

Comparative Study

Teacher education programmes vary from country to country. Even within the same country, occasionally and for good reasons, there may be regional or institutional variations. These international and also regional variations are mainly due to socio-economic and cultural differences among nations and regions. This is revealed quite explicitly through the review of teacher education programmes of seven countries, namely India, U.S.S.R., U.S.A., Sweden, Cuba, U.K. and Bangladesh. However, it may also be seen that these programmes of teacher education are similar in many important and vital ways.

In all these countries, the society tends to attach some importance to the continuous education and training of school teachers beyond the level of initial education but with variation in emphasis on different aspects and approaches.

While the initial education before pre-service training for primary school teachers in India and Cuba appears to be less than that of primary school teachers of Bangladesh in terms of years of schooling, it is much higher in the four other countries under review than that of primary school teachers in Bangladesh. The duration of teacher education programmes for primary education or elementary education is obviously much longer in all these countries including India and Cuba than the duration of the same for primary school teachers in Bangladesh.

In terms of number of years of pre-service schooling, primary school teachers in all the countries under review have to undergo a longer period of preparation than their counterparts in Bangladesh. It seems that the programmes for teacher preparation in those other countries consist of more rigorous and intensive curricular offerings in content as well as pedagogical subjects. Although at transitional periods the countries are known to have relaxed the pre-service education requirements for all types of teachers generally and for primary school teachers particularly, they tend to realise that teachers need continuous education. Those countries have eventually developed efficient programmes for in-service education for teachers. Bangladesh is yet to develop a regular system of in-service education for teachers.

In the industrially developed countries, there is little distinction between preparation and status of primary and secondary school teachers. Aptitude and interest rather than lower educational preparation alone determine the placement

of intending teachers in training programmes as well as teaching positions. But in a developing country like Bangladesh the determining factor is the level of pre-service education alone in this respect. The incorrect notion, that the lower the level of education at which a teacher works the lower should be his qualification and status, does not really hold in those societies. In Bangladesh the predominant thinking is that the less qualified and ill-equipped teachers should be placed at the lower levels of education.

The trends in teacher education in the advanced countries indicated that teacher education is being gradually assimilated and often inseparably merged with higher and university education. In Bangladesh, and also to some extent in a developing country like India, the teacher education programmes are yet to be integrated with university education. While in India there is a conscious effort for such integration, in Bangladesh the educational leaders are sceptical about the feasibility of such an assimilation, in spite of the recently introduced casual degree programmes of the Colleges of Education. These colleges lack the basic requirements of degree colleges in many ways.

It may be seen that the more advanced nations do not tend to isolate the teacher education programmes for primary education from those of secondary education, that in some of the advanced countries teacher education programmes are geared to the needs and talents of the trainees, that industrially developed nations or socialist countries tend to put more emphasis on technical or technological education as part of teacher education, that physical and health education is a part of teacher education and that special provisions are available for the training of teachers for special education.

Teacher Preparation for Secondary Education and Leadership in Education

It would appear from a review of the systems of teacher education under consideration that quite rich and elaborate programmes for teacher education, backed by educational experimentations and innovations, have been developed in the richer countries and are being developed in the other countries. A variety of degree programmes and specialisations has been evolved, depending upon the needs of the countries. These programmes are mainly meant for preparation of secondary school teachers and administrators. There are also special programmes for preparation of teachers of teacher training institutions, specialist teachers, teachers for technological institutions, educational research specialists, planning experts, educational psychologists and so on. The programmes range between the Baccalaureate to the Doctorate or even post-doctorate degrees. Many of these programmes are specifically directed towards preparation of educational leaders and experts. In the richer countries the discernible trend is to merge these programmes with university education or to administer them through highly specialised centres of learning.

In some of the countries under review, special agencies or centres like Institute of Education, National Council for Educational Research and Training, Academy of Pedagogical Sciences and a variety of professional organizations have been vested with the responsibility for conducting educational research and experimentations, developing innovative curricula for various levels of education, reviewing the progress of educational developments, planning for education, setting up special committees or commissions, holding seminars and conferences on special problems and issues, and so on. Often international organizations like UNESCO, UNICEF, World Bank, etc., co-operate with these national agencies in their efforts for improvement of education.

To a great extent the main responsibility for preparation of different categories of secondary school teachers in Bangladesh rests on the Teachers'

Training Colleges, the Colleges of Education (set up only very recently), the Technical Teachers' Training College, the College of Physical Education and the Institute of Education and Research.

But the supply of such teachers for secondary schools from these institutions is so meagre that an abnormally long time will be needed by these institutions to produce a sufficient number of teachers for the existing 8,000 secondary schools of Bangladesh. Their combined impact on the education system is so small that even today not more than 30% of secondary school teachers are trained. Besides, for obvious socio-economic reasons the trained graduates of these programmes are concentrated in the urban secondary schools (run mostly by the Government or public bodies). This is the situation in Bangladesh in spite of the fact that the degree programmes of the institutions, which are directed towards the fulfilment of this purpose, are merely one-year programmes beyond 14 years of schooling, whereas in most of the countries under review such degree programmes are usually of a duration of at least two years after 16 years of schooling. In those countries specialist secondary teachers have to undergo training for further periods beyond the initial preparation. Besides, somehow these teacher education institutions in Bangladesh, with few exceptions, have been reduced to merely degree giving institutions rather than real centres of learning and innovation.

Institutions Concerned with Teacher Education

Curricular and physical facilities at the Primary Training Institutes appear to be too poor to produce efficient teachers for primary schools. In the recently established Colleges of Education the physical facilities appear to be moderately adequate for present purposes, but in respect of equipment and reading materials these colleges are still poor. The Colleges of Education are yet to really achieve the status of degree colleges, although their programme reflects a genuine effort for integration of teacher education with higher education.

The Technical Teachers' Training College, the only one of its kind in the country, has a shortage of staff and lacks many of the basic necessities of a good training programme for education of teachers of Polytechnic Institutes.

The teacher education programmes of the six Teachers' Training Colleges appear to suffer for lack of physical facilities, adequate supply of books and other appropriate reading materials and trained personnel to handle and produce aids and equipment.

Although there are inadequacies in minor details, the physical facilities and equipment for the programmes of the Institute of Education and Research seem, on the whole, to be adequate. Of course, there is ample scope and need for their improvement. The library services and supply of materials in the library need improvement.

Conclusions on the Basis of Interviews

The stated or implied curricular objectives of the institutions dealing with teacher education programmes in Bangladesh were found to be only partially realised through the curricular practices, activities, and provisions. The curricular objectives of the programmes are not quite consistent with the socio-economic demands of Bangladesh today. Although some aspects of the programmes satisfy the present needs of the country, there are aspects of the programmes which satisfy neither the objectives for which they were set up nor the needs of the society.

In respect of the duration of the programmes, there was agreement by teachers and graduates that it should be extended. The methods of teaching, supply of books, evaluation systems, aids and equipment, scope for innovation and experimentation, need to be modified so that they conform to the objectives as well as the needs of education in the country.

Although the programmes are producing efficient teachers for schools in Bangladesh to some extent, the specialised programmes of the post-graduate level have so far failed to produce educational leaders, such as efficient educational planners and administrators, educational counsellors and guidance workers, educational researchers, curriculum specialists, and other experts in the field of education.

There is need to assimilate teacher education with higher education (university education) and thereby bring teacher education programmes into the mainstream of university education. At present the teacher education programmes are very much traditional and isolated from other programmes of education in the country.

General Considerations

The impact of the teacher education programmes of Bangladesh is still felt very little on the education system. A large number of teachers, especially in the secondary level, are untrained, in spite of the fact that the durations of the programmes are generally quite short (one academic year). The curricula of these teacher education programmes are bound to be limited in scope mainly because of this. Any effective improvement of the curricula can be made if this limitation is removed. At present the duration of the programmes cannot be increased very soon as the country has to produce a sufficient number of trained teachers for the schools. However the situation may be improved a little by introducing a system of in-service training for all teachers and ensuring a continuous education for them.

In Bangladesh trained teachers find very little scope to apply properly the methods and techniques of teaching they learn through the teacher education programmes. The school authorities, the education department, and the training institutions should make co-operative and joint efforts to ensure such application.

It was observed that the higher the level of teacher education the less is its possibility for application in the educational institutions in this country. The applicability of teacher education may be improved by incorporating contents in the programmes which are more consistent with the objective conditions of the country as well as the life of the people. Otherwise, much of teacher education will add to wastage in education.

Properly equipped institutions and organizations should be set up for the purpose of conducting educational research in Bangladesh. The institutions concerned with teacher education in this country should co-operate with such research organizations. This set-up should develop or discover methods and techniques of teaching and effective learning, equipment and aids, evaluative instruments, planning models, etc. The educational institutions should use the outcomes of such research work for improvement of their practices.

SELF-INSTRUCTIONAL MODULES IN THE PRACTICE OF PEDAGOGICAL PRINCIPLES

Dr. Fatimah Hamid-Don, Dean, Faculty of Education,
University of Malaya

During the 1974/75 session, the Pedagogical Studies Division which offers a basic compulsory course for all students entitled Practice of Pedagogical Principles initiated a project in which students were required to develop and evaluate self-instructional packages in their respective subject areas. This project involved 5 lecturers and approximately 600 students, in five subject (methods) areas: language, social studies, mathematics, physics-chemistry, biology. The course, Practice of Pedagogical Principles, comprises ten basic lectures on the following topics:

1. Analysis of instructional objectives
2. Analysis of instructional design
3. Analysis of instructional sequences
4. Analysis of procedures of self-instruction
5. Production of self-instructional sets
6. Developing evaluation instruments
7. Testing techniques
8. Techniques of data collection
9. Techniques of data analysis
10. Production of evaluation items.

At the start of the project (course) students were briefed on the course and their assignment which would count as part of the course assignment. The following procedure was adopted:

1. On the basis of their first method subject (or second method subject in the case of those offering Chinese Language, Economics, or Agricultural Science as 1st method) students organised themselves into groups of 5.

2. Each group was assigned a topic based on the relevant Form V syllabuses.

3. Groups discussed informally how the assigned topic might be taught, and how it might be tested.

4. When lectures on Instructional Design and Instructional Evaluation had been delivered, the groups would draft the instructional package.

5. The draft self-instructional package which comprised a self-instructional programme and an achievement test was then submitted to the lecturers for approval prior to production in quantity. A copy of an Interest Inventory was also provided to the group for duplication.

6. During the 1st week of teaching practice, in ccnsultation with the subject teacher of the school, 12 pupils were selected for a try out - 4 above average, 4 average and 4 below average. The pupils were divided into 2 matched groups - the Experimental and the Control Group. The Self-Instructional programme and the Interest Inventory were then administered to the Experimental Group only.

7. Achievement test was then administered to both the Control and Experimental Groups.

8. Results were entered in coding sheets and submitted to the lecturers concerned.

9. For purposes of analysis members of the group:

(a) Computed total achievement test scores for both experimental and control groups and compared their scores.

(b) Performed an item analysis of the test data.

(c) Computed frequencies of responses by experimental group pupils to each item of the Interest Inventory.

10. Students then submitted a report of the study in which the findings on the 12 pupils were discussed.

The chart at the end of this report maps out the time sequence of the various activities of the project.

THE OUTCOME

What has this project achieved? For one thing, as a result of the project a number of Self-Instructed packages have been developed by students. A listing of the packages developed is given below:

BIOLOGY S.I.P.

Topics:
1. Process of Diffusion and Osmosis
2. Fruit and Seed Dispersal System
3. Respiration and Energy Cycle
4. Soil as a Dynamic Living System
5. Alimentary and Digestive System of Mammal
6. Anatomy: Root and Stem Systems of Plants
7. Processes of Guttation and Transpiration
8. Axial and Appendicular Skeletal System (Mammal)
9. Circulatory System (Mammal)
10. Life History: Adaptive Mechanisms of the Insect (Cockroach and Mosquito)
11. Photosynthesis and the Energy Cycle

MATHEMATICS S.I.P.

Topics:
1. Three Diagrams in Probability
2. Sine Rule
3. Cosine Rule
4. Approximating Area under a Curve
5. Direct Proportions
6. Inverse Proportions
7. Shorthand Notation for Transformation
8. Combination of Transformation
9. Clockwork Arithmetic

PHYSICAL SCIENCES S.I.P.

Topics:
1. Electromagnetic Induction
2. Carbon Compound
3. Rates of Reactions
4. Reversible Reactions
5. Radioactive Decay
6. Oxidation-Reduction Reactions
7. Periodicity and Atomic Structure
8. The Periodic Table

LANGUAGES (ENGLISH & MALAY) S.I.P.

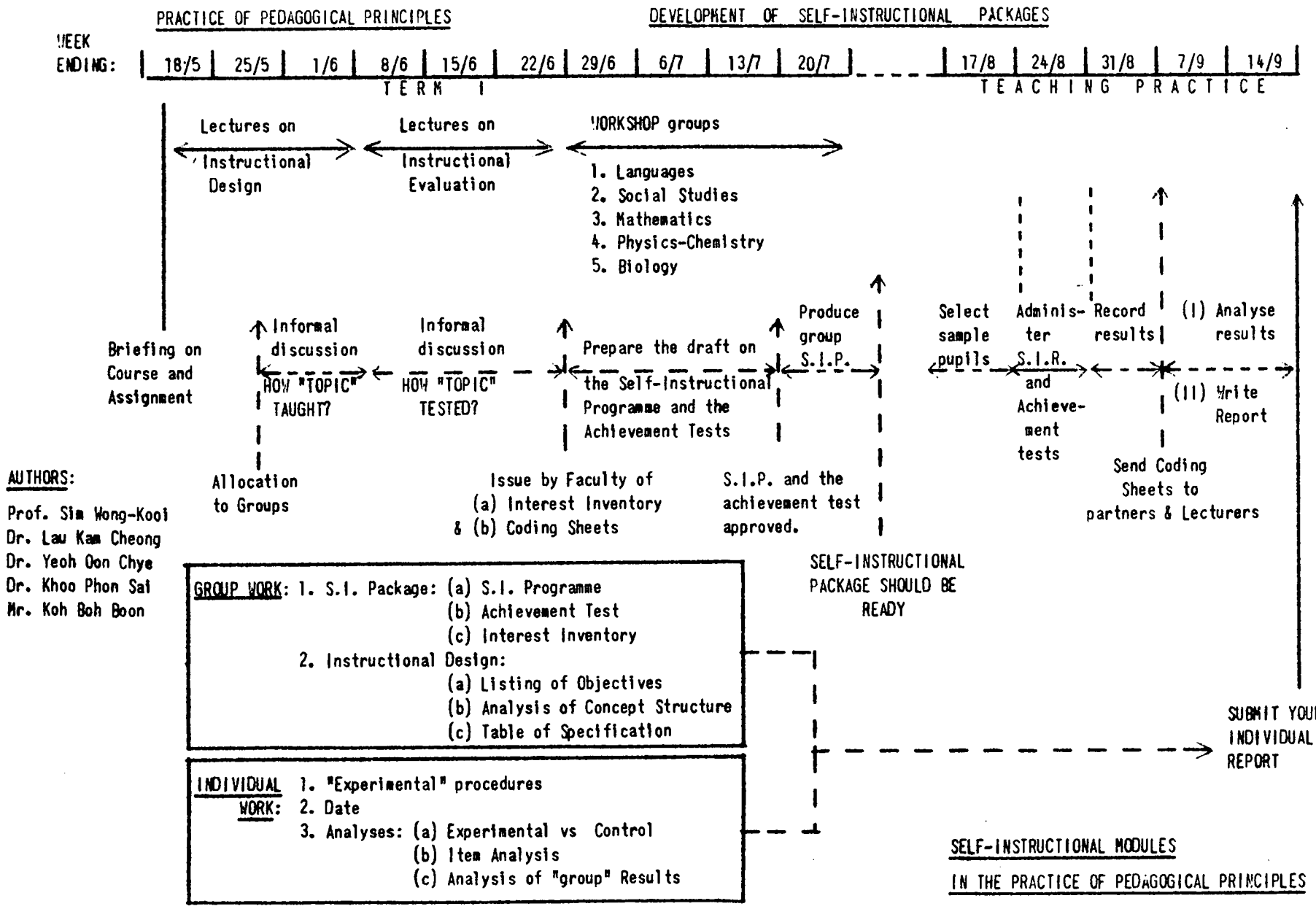
Topics:
1. Relative Pronouns
2. Conditional Tenses
3. Combination of Transformation
4. Prefixes and Suffixes
5. Persamaan dan Berbezaan Antara Pantun dan Syaer dari Segi Bentuk dan Isi
6. Jenis-jenis Pantun Berdanarkan pada Isi dan Bentuk
7. Pengunaan Sendi Untuk Menyambungkan Ayat Selepas Menjadi Berlapis

SOCIAL STUDIES S.I.P.

Topics:
1. Economic Activities and Population Problem
2. Population Change and Population Problems
3. Factors Affecting Population Patterns
4. The Straits Settlements
5. Causes for the Decline of Malacca
6. Kesultanan Melaka 1400-1511
7. Foundation of Malacca
8. The Advent of Islam and The Muslim Influence on Malay Society (Malacca)
9. Struktur dan Organisasi Perdagangan di Melaka 1402-1511

In what way was this superior as a training procedure, as compared with the more traditional methods? Comparison of this nature is of course difficult when objectives are different and diverse. However, it can be safely said that for the students the experience was a novel one. They were led through

specific phases of material development, try-out, revision and testing, and at the end of the project acquired instructional packages which they could use in the schools, to further revise and improve. Will they become effective teachers? It is anticipated that the project team lecturers will include longitudinal studies on these students in the future.


PRACTICE OF PEDAGOGICAL PRINCIPLES
DEVELOPMENT OF SELF-INSTRUCTIONAL PACKAGES
WEEK ENDING:
18/5
25/5
1/6
8/6
15/6
22/6
29/6
6/7
13/7
20/7
17/8
24/8
31/8
7/9
14/9
TERM I
TEACHING PRACTICE
Lectures on Instructional Design
Lectures on Instructional Evaluation
WORKSHOP groups
1. Languages
2. Social Studies
3. Mathematics
4. Physics-Chemistry
5. Biology
Briefing on Course and Assignment
Informal discussion HOW "TOPIC" TAUGHT?
Informal discussion HOW "TOPIC" TESTED?
Prepare the draft on the Self-Instructional Programme and the Achievement Tests
Produce group S.I.P.
Select sample pupils
Administer S.I.R. and Achievement tests
Record results
(I) Analyse results
(II) Write Report
Allocation to Groups
Issue by Faculty of (a) Interest Inventory & (b) Coding Sheets
S.I.P. and the achievement test approved.
Send Coding Sheets to partners & Lecturers
AUTHORS:
Prof. Sim Wong-Kooi
Dr. Lau Kam Cheong
Dr. Yeoh Oon Chye
Dr. Khoo Phon Sai
Mr. Koh Boh Boon
GROUP WORK: 1. S.I. Package: (a) S.I. Programme
(b) Achievement Test
(c) Interest Inventory
2. Instructional Design:
(a) Listing of Objectives
(b) Analysis of Concept Structure
(c) Table of Specification
SELF-INSTRUCTIONAL PACKAGE SHOULD BE READY
SUBMIT YOUR INDIVIDUAL REPORT
INDIVIDUAL WORK: 1. "Experimental" procedures
2. Date
3. Analyses: (a) Experimental vs Control
(b) Item Analysis
(c) Analysis of "group" Results
SELF-INSTRUCTIONAL MODULES
IN THE PRACTICE OF PEDAGOGICAL PRINCIPLES

SELF-EVALUATION BY HIGH SCHOOL PUPILS

Dr. O.C. Nwana
Director, Curriculum-Development Centre, University of Nigeria

In the traditional setting, evaluation of the attainment of school pupils has been done exclusively by the teachers and public examining bodies. Hardly any opportunity has been given to pupils to evaluate themselves in a regular and deliberate manner. The purpose of this study was to find out whether or not high school pupils can and do assess themselves, the nature of the assessment, its relationship with that done by their class teachers, and the effect of experience on the assessment. Motivation for this study was derived from the dialogue that followed a presentation made to the first Commonwealth Planning Conference on Public Examinations by the author in 1973. The report[1] of the conference had this to say on the topic:

> "The value of self-evaluation and peer-evaluation does not seem to have been fully appreciated and further development in this area would be useful. Care must be taken, however, that these techniques do not lead to an excessively competitive and negative reaction, self-derogatory and critical rather than positive and appreciative. As education is likely to move increasingly in the direction of informal and individual learning, self-evaluation will acquire an increasing importance so that improvements in this technique will be of much practical utility."

INSTRUMENTATION AND DESIGN

A brief questionnaire was developed consisting of six questions each with multiple answers provided for the pupils to select. A copy of the questionnaire is presented in the appendix. Question One enquired whether the pupil was interested in the subject. The idea was to determine on a five-point scale (spanning from 'Very Highly Interested' to 'Very Much Dislike') the pupil's level of interest. Question Two enquired how well the pupil performed usually in the subject. In other words the pupil was asked to indicate at what level on a five-point scale (spanning from 'Very Good' to 'Very Poor') he rated himself. Question Three enquired whether the subject teacher was fair in rating the pupil's work in terms of whether he was 'Over-Rated' through being 'Appropriately-Rated' to being 'Under-Rated'. Question Four enquired what range of marks the pupil would award himself in the subject that truly represents his achievements, if given the opportunity to mark his work. This assessment was done using the widely known system of percentage-marks grouped into a ten-point scale (Spanning from '1% to 10%' through '55% to 60%' to '91% to 100%'). Question Five enquired whether the pupil thought he knew about how capable he was in school work. In other words he was to indicate the extent of his knowledge of his capability on a three-point scale (spanning from 'Exact-Knowledge' to 'No-Knowledge'). Emphasis here is on "Knowledge" of capability rather than "Level" of achievement as in the case of Question Two and Question Four. Question Six enquired who should assess the pupil's work - the teachers, the pupils, or both. The six variables are summarised as follows:-

(1) Interest (INT)
(2) Self-Rated Achievement (SRA)
(3) Fairness of Teachers Ratings (FTR)

(4) Self-Marked Achievement(SMA)
(5) Knowledge of Capability (KC)
(6) Who Should Assess (WSA)

A seventh variable namely 'Actual Achievement', (ACT) was not indicated to the pupils in the questionnaire but was obtained from school records of the Mid-Year Examination for Forms 1 and 3, and the Mock-School Certificate Examination for Form 5. Four school subjects were selected for the study namely English Language, Mathematics, History, and Biology. The choice of subjects was influenced by the desire to include arts and science subjects, as well as subjects that have relatively high percentage of offering in the secondary schools. This report embodies the result for English Language alone.

Three Schools in the Nsukka area of the East Central State of Nigeria were used - one a boys school, one a girls school, and one a mixed school. In each school, one class each of Form 1, Form 3 and Form 5 was randomly selected and used for the study. The first, middle, and last forms of the secondary school were chosen to enable the analysis of possible effects of maturity on the variables under consideration. Every member of each class selected was given the questionnaire to complete under the direction of the author. During the exercise, class teachers were asked to keep off their classes as their presence would have influenced the response of the pupils to the questions. The pupils were assured that all information given by them would be kept confidential. At the end of each session, the members of each class were given an opportunity to react to the questions individually and the instrument as a whole. The opinions expressed during these discussions proved useful in the interpretation of the results.

RESULTS AND ANALYSIS

The frequencies of pupils responding to the various items of the questionnaire were summed up on a form to form basis and tabulated for each variables. The Chi-Squared test was used in the analysis. In each case tested, frequencies were appropriately combined to avoid or reduce the use of correction formulae where expected frequencies are very small in magnitude. Table 1 shows the frequency distribution of Interest levels within the three forms.

Table 1

Frequency Distribution of Interest in English Language

	Interest	Form 1	Form 3	Form 5	Total
(a)	Highly Interested	66	72	49	189
(b)	Interested	28	13	20	61
(c)	Indifferent	1	2	3	6
(d)	Dislike	0	0	1	1
(e)	Much Dislike	0	0	0	0
	Total	95	87	73	255

The table shows that generally there was a high level of interest in English Language. A Chi-Squared test investigating the hypothesis that there was no difference in the pattern of interest of the three forms was accepted (Chi-Squared = 9.20 with 4 degrees of freedom) at the 0.05 and 0.01 levels of significance.

Table 2 shows the frequency distribution of Self-Rated Achievement within the three forms.

Table 2

Frequency Distribution of Self-Rated Achievement

	Self-Rated Achievement	Form 1	Form 3	Form 5	Total
(a)	Very Good	36	26	4	66
(b)	Good	46	41	23	110
(c)	Average	13	20	46	79
(d)	Poor	0	0	0	0
(e)	Very Poor	0	0	0	0
	Total	95	87	73	255

The table shows that generally the pupils feel that their level of achievement in English Language is good. A Chi-Squared test investigating the hypothesis that there was no difference in the pattern of achievement of the three forms was rejected (Chi-Squared = 55.96 with 4 degrees of freedom) at the 0.05 and 0.01 levels of significance. A coefficient of contingency was determined and gave - 0.42 for the relationship between level of self-rated achievement and the form attained. This shows that the higher the form attained the lower the level of self-rated achievement in English Language.

Table 3 shows the frequency distribution of the Fairness of the Teachers Ratings within the three forms.

Table 3

Frequency Distribution of Fairness of Teachers Ratings

	Fairness of Teachers Ratings	Form 1	Form 3	Form 5	Total
(a)	Much Over-Rated	17	5	0	22
(b)	A Bit Over-Rated	29	13	1	43
(c)	Appropriate	45	65	58	168
(d)	A Bit Under-Rated	1	4	12	17
(e)	Much Under-Rated	3	0	2	5
	Total	95	87	73	255

The table shows that generally the ratings by the teachers were deemed appropriate by the pupils with a slight bias towards being a bit of an over-rating. A Chi-Squared test investigating the hypothesis that there was no difference in the pattern of fairness in the three forms was rejected (Chi-Squared = 38.16 with 6 degrees of freedom) at both the 0.05 and 0.01 levels of significance. A coefficient of contingency was determined and gave 0.36 for the relationship between level of fairness and form attained. This shows that whereas at the

lower forms the pupils thought that they were somewhat over-rated by their teachers, at the higher forms the pupils held the reverse view that they were somewhat under-rated by their teachers.

Table 4 shows the frequency distribution of Self-Marked Achievement with the three forms.

Table 4

Frequency Distribution of Self-Marked Achievement

	Self-Marked Achievement	Form 1	Form 3	Form 5	Total
(a)	81% to 100%	59	31	5	95
(b)	61% to 80%	35	54	48	135
(c)	41% to 60%	1	2	20	23
(d)	21% to 40%	0	0	0	0
(e)	1% to 20%	0	0	0	0
	Total	95	87	73	255

The table shows that generally the pupils would award themselves marks ranging from 61% to 80% i.e. high marks. A Chi-Squared test investigating the hypothesis that there was no difference in the range of marks awarded in the three forms was rejected (Chi-Squared = 80.45 with 4 degrees of freedom) at both the 0.05 and 0.01 levels of significance. A coefficient of contingency was determined and gave - 0.49 for the relationship between self-marked achievement and the form attained. In other words, pupils at the lower forms have tended to award themselves higher marks than pupils at the upper forms.

Table 5 shows the frequency distribution of the pupils' knowledge of their Capability in School work within the three forms.

Table 5

Frequency Distribution of Knowledge of Capability

	Knowledge of Capability	Form 1	Form 3	Form 5	Total
(a)	Exact Knowledge	47	31	43	121
(b)	Vague Knowledge	43	52	28	123
(c)	No Knowledge	5	4	2	11
	Total	95	87	73	255

The table shows that generally pupils' Knowledge of their capability in school work was predominantly equally between exact knowledge and vague knowledge. A Chi-Squared test investigating the hypothesis that there was no difference in the level of knowledge of the pupils' capability in the three forms

was accepted (Chi-Squared - 8.87 with 2 degrees of freedom) at the 0.01 level of significance. It was however significant at the 0.05 level of significance. In other words, pupils in all three forms generally held similar views regarding how knowledgeable they were about their capability in school work.

Table 6 shows the frequency distribution of Who Should Assess the pupils' work in the three forms.

Table 6

Frequency Distribution of Who Should Assess

	Who Should Assess	Form 1	Form 3	Form 5	Total
(a)	Teachers Alone	73	78	55	206
(b)	Teachers & Pupils	22	7	18	47
(c)	Pupils Alone	0	2	0	2
	Total	95	87	73	255

The table shows that generally the pupils are of the opinion that their work should be assessed by teachers alone. A Chi-Squared test investigating the hypothesis that there was no difference in the three forms regarding who should assess their work was accepted (Chi-Squared = 6.75 with 2 degrees of freedom) at the 0.01 level of significance. It was however significant at the 0.05 level of significance. In other words, pupils in all three forms generally held similar views regarding who should assess their work.

As stated earlier in the paper, the seventh variable was the Actual Achievement of the pupils in class. Due to the fact that each school set a different examination from the others, the data for this variable could not be pooled for the three schools. The data were therefore analysed on a school to school basis. Table 7 shows the frequency distribution of the Actual Achievement of the pupils within the three forms for one of the three schools. The raw-scores were converted to descriptive terms using the following arbitrary but commonly used scheme: - 71% and above = Very Good; 61% to 70% = Good; 41% to 60% = Average; 31% to 40% = Poor; 30% and under = Very Poor.

Table 7

Frequency Distribution of Actual Achievement

	Actual Achievement	Form 1	Form 3	Form 5	Total
(a)	Very Good	0	8	2	10
(b)	Good	4	15	2	22
(c)	Average	25	18	12	55
(d)	Poor	13	3	11	27
(e)	Very Poor	3	1	12	16
	Total	45	45	40	130

Due to the fact that the tests set for the three forms were different, it was not considered desirable or meaningful to compare the performance of the three groups. If a standardised test of achievement were to have been administered to the three forms, form to form comparison would have been appropriate. The variation in the distribution of performance shown in Table 7 can be accounted for jointly by the varied mean difficulty (or facility) of the tests set, and the level of industry of the groups. The present study was not designed to study the effects of these factors.

INTER-RELATIONSHIP OF THE VARIABLES

The study investigated the inter-relationships of the seven variables in question. A contingency Table was developed for each pair of variables to be correlated. As an illustration, Table 8 is the contingency table between Interest in English Language and Self-Rated Achievement in Form 1 in the three schools used for the study.

Table 8

Relationship between Interest and Self-Rated Achievement in Form 1

		Self-Rated Achievement					
		V. Poor	Poor	Average	Good	V. Good	Total
Interest	Highly Interested	-	-	9	25	32	66
	Interested	-	-	3	21	4	28
	Indifferent	-	-	1	-	-	1
	Dislike	-	-	-	-	-	-
	Much Dislike	-	-	-	-	-	-
	Total	-	-	13	46	36	95

For each contingency table, the frequencies were appropriately combined (where necessary), the Chi-Squared value determined, and the coefficient of contingency, C, also determined. In cases where Chi-Squared is not significant at both the 0.05 and 0.01 levels, the coefficients of contingency were not computed. Table 9 presents the results of the inter-relationships of the variables. Not all pairs of variables were correlated. Only pairs of special interest to the study were correlated. Due to the fact that the vast majority of the pupils were of the opinion that they were appropriately rated by their teachers (65%) it was thought unnecessary to correlate the variable Fairness of Teachers Ratings' with any of the others.

Table 9

Inter-Relationships of the Seven Variables

Variables	Form	X^2	d.f	C	Remarks
1. INT & SRA	1	11.43	2	0.33	Sig 0.01 level
2. " "	3	13.15	2	0.36	Sig 0.01 level
3. " "	5	0.94	1	-	Not Sig
4. SRA & SMA	1	9.42	2	0.30	Sig 0.01 level
5. " "	3	22.87	2	0.46	Sig 0.01 level
6. " "	5	12.09	1	0.38	Sig 0.01 level
7. KC & WSA	1	0.18	1	-	Not Sig
8. " "	3	0.35	1	-	Not Sig
9. " "	5	0.11	1	-	Not Sig
10. ACT & INT	1	5.24	1	0.32	Sig at 0.05 level
11. " "	3	0.01	1	-	Not Sig
12. " "	5	0.11	1	-	Not Sig
13. ACT & SRA	1	2.36	1	-	Not Sig
14. " "	3	0.14	2	-	Not Sig
15. " "	5	0.11	1	-	Not Sig
16. ACT & SMA	1	0.08	1	-	Not Sig
17. " "	3	0.20	1	-	Not Sig
18. " "	5	3.58	1	-	Not Sig
19. ACT & KC	1	7.77	1	0.38	Sig at 0.01 level
20. " "	3	2.27	1	-	Not Sig
21. " "	5	0.02	1	-	Not Sig
22. ACT & WSA	1	3.02	1	-	Not Sig
23. " "	3	0.54	1	-	Not Sig
24. " "	5	0.00	1	-	Not Sig

(a) Interest and Self-Rated Achievement

Table 9 shows that with the exception of Form 5 Interest is positively related to Self-Rated Achievement. In other words, in the lower and middle forms, pupils with lower interest in English Language tend to think that they have lower achievement than pupils with higher interest in the subject who tend to think that they have higher achievement. In the higher forms, interest and self-rated achievement are not related.

(b) Self-Rated and Self-Marked Achievement

Table 9 shows that in all three forms Self-Rated Achievement and Self-Marked Achievement are positively related. Those pupils who rate themselves low in achievement tend to award themselves low marks while those who rate themselves high in achievement tend to award themselves high marks.

(c) Knowledge of Capability and Who Should Rate

Table 9 shows that the level of knowledge of the capability of the pupils and the opinion regarding Who Should Assess their work are not related. Pupils with exact or vague knowledge of their capability hold the same opinion regarding who should assess their work in all three forms.

(d) Actual Achievement and Interest

Table 9 shows that with the exception of Form 1 the actual performance of the pupils is not related to their interest in the subject. Pupils with high and low interest levels performed equally well in the subject at the higher forms.

(e) Actual Achievement and Self-Rated Achievement

Table 9 shows that in all three forms, the actual achievement of the pupils is not related to their self-rated achievement. Put in another way, their concept of their level of achievement is not the same, generally speaking, as those held by their subject teachers in English Language.

(f) Actual Achievement and Self-Marked Achievement

Table 9 shows that in all three forms, the actual achievement of the pupils is not related to the marks they would award themselves if given the opportunity. This is similar to the situation in (e) and should be expected.

(g) Actual Achievement and Knowledge of Capability

Table 9 shows that with the exception of Form 1, the actual achievement of the pupils is not related to their knowledge of how capable they were. In Form 1, there was a tendency for those who have exact knowledge of their capability to be average or less in actual achievement while those who have vague knowledge of their capability tend to be average and above in actual achievement.

(h) Actual Achievement and Who Should Assess

Table 9 shows that in all three forms, the actual achievement of the pupils is not related to their opinion regarding who should assess their work. Poor, average, and good pupils hold equally the predominant opinion that their work should be assessed by teachers alone.

GENERAL DISCUSSION

The high level of interest shown in English Language may be in part accounted for by the fact that it is the medium of instruction in the schools as well as the official language of the country, Nigeria. One cannot get on in the country without the language; it is a symbol and often a measure of education. It is also a compulsory subject at the secondary school level. The rather limited variability within this variable is accountable in terms of its national importance. The subject has to be taught to pupils even if it means the use of ill-qualified tutors or tutors majoring in fields quite remote from the subject. Not to show interest in the subject is to admit failure in the whole programme of secondary and tertiary education.

That the pupils rated themselves lower the higher up they went in the school can be explained from point of view of maturity. The Form 1 pupils are recent graduates from the primary schools where they distinguished themselves as the cream of the school population. They tend to have a rather exalted opinion of themselves. By the time they have spent three to five years in the secondary school, they become more conservative, they begin to feel less sure of themselves. The threat of the School Certificate Examination makes the vast majority of them feel that they do not have command of even what they have learnt so well. Around the School Certificate period, the pupils feel 'so empty' and yet they have learnt 'so much'.

The view held by the majority of pupils that the ratings carried out by their teachers are appropriate is not based necessarily on the pupils understanding the principles of reliable and valid evaluation. It is based predominantly on the age-old respect and trust which pupils have in their teachers. When those pupils who thought that their teachers rated them appropriately were requested to explain why, most of them had nothing to say, while some replied 'he is the teacher, and he knows best'. On the relationship between Fairness of Teachers' Ratings and form attained it will be observed that high marks have often been used by teachers to gratify and motivate pupils at the lower forms. At the same time low marks have often been used to humiliate and motivate pupils at the higher forms. Suffice it to say that there are plausible educational reasons for and against this practice. The results of this study have shown that the pupils are aware of this fairly widely used teaching technique. In other words, it will be unwise to assume that the pupils are still being 'fooled' either by over-rating or under-rating their achievement.

It is interesting that the pupils think that they have a fairly good knowledge of their capability (47.45% with exact knowledge and 48.24% with vague knowledge) yet they are of the opinion that their work should be assessed by teachers alone. One would have expected a fairly positive correlation between the two variables. Those with exact knowledge may be expected to ask that pupils assess their work; those with vague knowledge may be expected to ask that both the pupils and the teachers assess their work; while those with no knowledge may be expected to ask that only the teachers should assess their work. The zero to near zero correlations obtained need to be explained. Discussions that followed the administration of the questionnaire clearly showed that the pupils distrusted one another - they would not let their fate be determined by their fellow colleagues. To summarise their views it can be said that "some will give high marks to their friends and relations" while "some will give low marks to their enemies and academic rivals". This feature of extraneous factors influencing the peer-ratings is currently being studied by the author.

The relationship between Self-Rated Achievement and Self-Marked Achievement has been shown to be positive. But it is low in magnitude. The limited relationship may be in part due to the fact that there was a general tendency to award rather higher marks than would have beeen expected from the level of self-rated achievement. The limited variability in both variables (no pupil rated himself poor or very poor, and few rated themselves as average) may have reduced the correlation between the variables.

Actual achievement did not relate to self-rated achievement. This result could be contrary to expectations. But the nature of the subject, English Language, may have something to do with the low correlation. As the medium of instruction in the schools, some pupils are prone to assume, without varification, that they are good in the subject. On the contrary, as a foreign language, some pupils are prone to assume, again without varification, that they cannot ever be so good in it. These two factors acting at cross purposes can grossly distort the view which the pupil has regarding his level of achievement in the subject, and consequently can affect adversely the correlation between this variable and the actual achievement of the pupils. The correlation between actual achievement and self-rated achievement in English Language is perhaps the most vital information to be derived from this study.

It is so because it is also a principal aim of this study and related studies to investigate the advisability of using the pupils' assessment of themselves in overall evaluation of their attainment. The present results would suggest that the assessment of school pupils in English Language should continue to be done by teachers alone being that the pupils' assessments of themselves are quite unrelated to those of their teachers. A basic assumption of this conclusion would be that the teachers' assessments constitute an ideal or criterion against which any other measures of the pupils' attainment must be evaluated. This assumption cannot always be upheld as it is well known that the reliability of marking essay-type answers in English Language is rather low. This is more so with teachers un-tutored in the techniques of improving the marking of essays as is the case with the group of teachers involved in the study. The present use of the teachers' ratings, i.e. actual achievement, as criterion has no other justification than that the teacher is the 'Master' whose opinion on academic matters has over the ages been thought of as being weightier than that of the 'Learner' or the parents.

To throw more light on the issue of low correlation between actual achievement and self-rated achievement, the reliability of the responses to self-rated achievement was determined. The questionnaire was administered to the same pupils three weeks after the first administration for Form 1, only. A contingency table was developed between the responses in the first administration and those of the second administration of the questionnaire. This is presented in Table 10. Chi-Squared was computed and gave 27.19% for 4 degrees of freedom. This is significant at both the 0.05 and 0.01 levels. A coefficient of contingency was determined and gave 0.47 for the relationship between responses in the two administrations of the questionnaire. The result suggests that the questionnaire was reliable with regard to self-rated achievement.

Table 10

Reliability Table for Self-Rated Achievement

	First Testing					
Second Testing	V. Poor	Poor	Average	Good	V. Good	Total
Very Good	-	-	-	15	17	32
Good	-	-	4	21	18	43
Average	-	-	7	10	1	18
Poor	-	-	2	-	-	2
Very Poor	-	-	-	-	-	-
Total	-	-	13	46	36	95

This result suggests that the low correlation between actual achievement and self-rated achievement may have been due to the low reliability of the achievement scores awarded by the teachers. One can therefore predict that with better marking schedules the relationship between actual achievement and self-rated achievement can improve.

Actual achievement of the pupils did not relate to their opinion regarding who should rate their work. One would have expected that high achievers would tend to opt for assessment by pupils, average achievers to opt for assessment by both pupils and teachers, and low achievers to opt for assessment by teachers. That this is not so may be due to the effect of mutual distrust which influenced their responses.

LIMITATIONS OF THE STUDY

A major limitation of the study is the fact that the number of pupils involved is not as large as could be most desired resulting from the rather limited geographical area covered by the project. This is a consequence of the fact that the study is essentially a pilot study one of whose objectives is to explore the field and pave the way for the more extensive studies to follow. The conclusions are therefore tentative in nature. Another factor that affected the results was that interest and attainment in English Language are affected by a multiplicity of variables amongst which one can name as examples the location of the school (whether urban or rural) the influence of the local vernacular language, the qualification and experience of the teachers, the aptitude of the learners, the availability of materials etc. These and similar relevant facts were not and could not be controlled in this exploratory study. Their single and joint effect on the results cannot therefore be assessed. Replication of the study under more controlled circumstances will throw more light on the effects, if any, of these variables on pupil assessment of themselves.

Editor's Note

This is the first part of a series. Similar studies were carried out by the author on Mathematics, Biology and History.

ATTITUDE SCALE DEVELOPMENT IN PAPUA NEW GUINEA

J. Jones and J. Shea, Education Research Unit,
University of Papua New Guinea

A great deal of the emphasis in education in Papua New Guinea is given to the question of attitude change. In spite of this there has been virtually no large-scale attempt to measure attitudes directly, mainly because of problems related to huge variations in culture and language. (There are over seven hundred significant language groupings in Papua New Guinea, and there is no one lingua franca).

Attempts to modify attitudes are most obvious in areas such as religious studies and social science where a major specified aim is an increase in racial, religious and cultural tolerance. This area has assumed considerable importance with increased governmental emphasis on political unity.

Attitudinal emphasis is less obvious but still important in the area of science which represents a style of dealing with problems which is quite new in the Papua New Guinea context. Again an emphasis is placed on creating awareness and tolerance of alternative viewpoints and ways of dealing with the world.

Accordingly efforts were made to provide attitude measures which could give some valid and reliable indications of changes in attitudes related to changes in educational level. Such measures would also have use in providing an indication of attitudes which exist in various parts of the community.

The emphasis was on measures of conservatism and of racial stereotypes. However it was necessary first to discover models of such attitude measures which could be followed in the Papua New Guinea situation.

Since the second world war a great deal of attention has been directed toward the investigation of attitudes in the general area of conservatism or authoritarianism. Much of this work was prompted by the anti-semitic behaviour which characterized Nazi Germany. One scale developed, in studies of "the authoritarian personality" (Adorno et al., 1950), was the ethnocentrism scale, a broad measure of rejection of "outgroups" (and glorification of "ingroups"). Another scale was the Fascism scale, or the California F as it came to be known. Those who scored high on the F scale also tended to score high of measures of ethnocentrism, anti-Semitism, anti-Negro feeling and political conservatism.

These scales were developed in the United States of America and came to reflect social concerns within that country. Rokeach (1960) raised an allied, more fundamental objection. He noted that although social scientists have employed various general concepts in studying authoritarianism - concepts such as intolerance, discrimination, prejudice, bigotry, social

distance, and ethnocentrism - the attitude scales produced selected out bigots on the political right. Furthermore there are other forms of intolerance based upon criteria different from those ethnic and racial ones usually used, which should be studied. What was important was not what a person believed, but how he believed. Rokeach proposed the concept of dogmatism, or closed-mindedness to account for a more generalized intolerance.

Wilson and Patterson (1968) adopted an approach to attitude measurement which answered some of Rokeach's objections, proposing a notion of conservatism extending much beyond ideas of ethnic intolerance and right-wing political views. They name seven characteristics of the extreme conservative.

(a) Religious fundamentalism
(b) Right wing political orientation
(c) Insistence on strict rules and punishments
(d) Intolerance of minority groups
(e) Preference for conventional art, clothing, institutions
(f) Anti-hedonistic outlook
(g) Superstitious resistance to science.

The Wilson-Patterson C scale, with items derived from these areas has had remarkable success in sorting out "Known groups" of conservatives and non-conservatives in New Zealand, England and Holland. It seemed a useful model to explore for use in highly Christian Papua New Guinea.

Apart from its content, the structure of the C scale offers many advantages. It uses "catch-phrases" in place of the traditional propositional statements. These are brief labels representing various familiar and controversial issues (e.g. death penalty, abortion, evolution, women judges, etc.) to which respondents should be able to indicate their "positions" immediately with a minimum of cognitive evaluation. The item format should, therefore, reduce the influence of cognitive processes, task conflict, grammatical confusion and social desirability. Such considerations are of major importance in the Papua New Guinea context where for most students English is a second language.

The original C scale has 50 items. Ten more items which appeared relevant to the Papua New Guinea context (such as "Afro hair styles", "obeying parents" and "tertiary education for women") were added, and the 60 items were administered to a total of 213 students preparing to enter University.

Of the four basic measures against which Wilson and Patterson validated their scale, age of subject, political affiliation, religious allegiance and sex, only the later two seemed appropriate for use with the Papua New Guinea students. (The narrow age range made validation by age impossible, and political parties in Papua New Guinea seem not to fit readily into the left-right continuum common in Western countries, largely because of regional biases.) Measures of divergent thinking were taken, and related to "Conservatism" scores since Hudson's (1966) description of a converger seems to describe a conservative, while his description of a diverger seems to fit a non-conservative.

Scores on the sixty items were clearly (and significantly) related to church attendance, though the correlation was small probably because of the homogeneity of the sample with respect to this behaviour. (Most of the subjects reported regular church attendance.) There was also an unexpected

V shaped relationship with divergent thinking. Though this result could be interpreted in a way consistent with the validity of the Conservatism measure (Jones and Shea, 1974), further validation seemed necessary.

Intercorrelations of items with each other, and with the total score indicated that many items were unsatisfactory. To improve the measure, and to reduce the scale to a more convenient size, the thirty items which showed the lowest correlations with the total scale were eliminated. This removed items such as "empire-building", probably an unfamiliar phrase to Papua New Guineans, and others like "Socialism" which seem not to relate to conservative responses as they do in New Zealand. The very few subjects who disapproved of "Socialism" were among those scoring at the low end of the conservatism scale.

After this selection of items, an attempt was made to validate the 30 item scale with a total sample of 434 students from high schools and University. Scores on the 30 item scale were found to be highly related to educational level (negatively), church attendance (positively), sex (females more conservative), and the amount of rural schooling (positive). Longitudinal observations indicated that changes in conservatism within groups occurred as educational level increased, thus suggesting that other differences found between students of differing educational level were influenced to some degree by the actual educational experience. Cross-cultural comparisons indicated that the 30 item scale could be used successfully with expatriates (mostly of Australian origin), as well as with educated Papua New Guineans. Papua New Guineans were more conservative than expatriates.

The evidence suggests that the 30 item scale is valid. Reliability studies showed a test-retest reliability of .84, and an internal consistency score (Alpha coefficient) of .81. The internal consistency increases with the educational level of the sub-samples thus indicating increased relevance of the conservatism dimension with increasing education. Thus we have available to valid and reliable measure of conservatism. However, its usefulness is restricted to educated Papua New Guineans fluent in English. Attempts are presently being made to develop a non-verbal scale so that more extensive attitude measurement may be carried out.

RACIAL ATTITUDES

Concurrent with the development of the broadly based conservatism scale, a measure of racial stereotypes was constructed. The motivation for its development was similar.

A questionnaire using 15 bipolar adjective pairs (e.g. kind/cruel; weak/strong) which were referred to 8 "target" groups within Papua New Guinea was administered to a total sample of 273 high school and university students. Responses indicated that people with lower educational experience have a greater tendency to stereotype other groups. University students showed least stereotyping. Follow-up studies suggested that living with members of other racial/cultural groups helped break down stereotypes fostered by isolation, ignorance and the news media.

NATURE AND STRUCTURE OF MORAL EDUCATION IN WESTERN STATE SECONDARY SCHOOLS

Dr. J. Ade Akinpelu
Department of Adult Education, University of Ibadan

The aim of this project was to find out what is being done with respect to the moral development of students in Western Nigerian Secondary Grammar Schools. There are 226 of these schools as of December 1971.

As school principals are generally regarded as the administrative and chief instructional heads of their schools, it was felt that they would be in a good position to describe what is taking place in the area of moral instruction of their students. Since there are only 226 of them according to the number of the then existing schools, it was decided to pool all of them through questionnaires administered by mail.

Secondary Modern Schools and Teachers (Training) Colleges have been left out because neither of these categories of institutions has featured to any prominent degree in the disturbances that have racked the State's educational institutions in the last few years.

A comprehensive questionnaire designed to tap both opinions of principals and their factual description of avenues of moral education was mailed to each school principal, with the alternative that the Vice-Principal could also fill it in in case the substantive head was not available or was otherwise engaged. The mailing of the questionnaires was followed by personal visits to some of the sorely afflicted schools in part of the State - the purpose of which was to get as much response from them as possible. These schools lie especially in Ibadan and Ondo provinces, the two provinces with the largest networks of schools in the State.

Return of Questionnaires

The return of questionnaires has not been very satisfactory, on the whole, despite strenuous efforts to achieve a maximum return. The efforts included an advanced briefing and soliciting of the help and co-operation of most of the principals during their 3rd Annual Administration and Supervision Seminar held at the University of Ife in August 1971; mailing of questionnaires in December 1971 with stamped self-addressed envelopes enclosed; sending a reminder in February 1972; and paying personal visits to selected secondary schools mentioned above to "demand" return of forms whether filled or unfilled.

After all the efforts, only 74 questionnaire forms were returned out of the 226 mailed out, giving us 32.7% returns. (The 75th form to be returned crawled in when this report was being written, and so could not be used in the analysis.) 32.7% return appears to be low but then it is still an improvement over some fairly recent experiences. For example, in a similar project to survey the incidence of major offences in Nigerian Secondary Schools, O.C. Nwana reported: in all, 210 questionnaires were despatched, but after two reminders,

only 52 completed forms were received, i.e. about 25% response", and "of the 52 returned, only 31 were properly filled....." (see West African Journal of Education, Vol. 15 No. 2 of 1971 p.99). That is, only about 14.8% of the total population formed the basis of his analysis and conclusions in that study.

Of the 74 returned questionnaires in our own survey, 4 were returned blank - 2 of them with the wry comments "Return to Sender", printed on the envelopes. So, it is only 70 properly filled and returned questionnaires that form the data of this report.

It will be of interest to find out the source of the resistance and hostility of teachers, and especially school principals, to filling questionnaires even when the topic does not threaten their position, and even when they stand to gain most from the experiment as, hopefully, they do in this case.

Analysis of Returns

Despite the low percentage of returns, the investigator is satisfied with the eventual "distribution" or "representativeness" of the 70 properly completed forms.

Provincial Representation

There is no province or division in the Western State that is without representation in the final data. There is no province with less than 25% returned out of the total sent to that province. As a result of personal "campaigns" in Ibadan and Ondo provinces, the percentages of returns have been raised to 31.0% and 36.9% respectively. Perhaps one lesson that we can draw for the future is that most probably the investigator's personal visits to administer and collect back questionnaires would yield more substantial results. It will be more expensive but it will be more rewarding.

Province	No. Returned	% Return
1. Abeokuta	6	27.3%
2. Ibadan	22	31.0%
3. Ijebu	10	38.4%
4. Ondo	24	36.9%
5. Oyo	12	28.6%
Total	74	32.7%

Denominational Presentation

Of the 70 schools which checked the boxes on religious or non-religious affiliation, 43 reported themselves as having been founded and still being run by one religious organization or another, while 27 reported themselves as being either private, local authority, Government, Community, or "secular voluntary" - to quote the exact phrase of one of the principals. This proportion compares favourably with the distribution of schools according to denomination in the Western State. Out of the 226 schools in the West, 123 are under one denominational control or another, while 103 i.e. 45.6% are either completely religiously neutral or, in a few cases, with very loose association. (An example of this

loose association is that in which a community founded a school but handed it over to the most popular religious organization in the area to run. In such a case, the religious organization often contributes nothing financially, and hence the school cannot be described as a denominational school.)

Rural-Urban Distribution

In terms of rural-urban distribution, 37 of the schools are reported as being in the rural area, while 33 are in the urban.

Incidence of Student Indiscipline

Of the 70 schools, 32 are reported as having had some disciplinary problems in the last 5 years, while 38 are without such incidents.

It hardly needs be over-emphasized that the degree of trust to be put in the conclusions, generalizations and inferences that will be made in this study is very much dependent upon the percentage of the returned questionnaire forms.

CONCEPT OF MORAL EDUCATION

To find out the principals' conception of moral education, ten popular definitions were presented out of which they were asked to select 5 and rank them in order of importance or preference. The percentage results, are tabulated hereunder:

Moral Education is the inculcation of the	1st Choice	2nd Choice	3rd Choice	4th Choice	5th Choice	Percentage Choosing
1. Habit of disciplining and controlling one's emotions and passions	12.9	10	18.6	15.7	14.3	71.4
2. Ability to distinguish between right & wrong	24.3	20	4.3	7.1	8.6	64.3
3. Attitude of "doing to others as you would that they should do unto you"	5.7	15.7	17.1	17.1	8.6	64.3
4. Habit of obedience to authority and respect for elders	2.9	14.3	10.0	22.9	11.4	61.4
5. Ability to maintain a proper relation with God	31.4	7.1	7.1	0.0	5.7	51.4

From the table above, it will be observed that the definition which receives the highest endorsement on the whole is that which conceives moral education as

"the inculcation of the habit of disciplining and controlling one's emotions and passions". 71.4% of the 70 principals responding chose this item on the whole, and their choice was evenly distributed throughout the five preference columns.

On the other hand, the item which defines moral education in terms of "the ability to maintain a proper relationship with God" comes 5th down the line with 51.4% selecting it on the whole; but it is significant to note that 31.4% of all the principals make it their first choice - as against 12.9% as first choice in the most frequently selected item noted above.

Also of interest are the results of another item which is not included in the table above but which needs some discussion in view of the popular belief about it. The item in question defines moral education as the "inculcation of the right and proper behaviour in matters involving the opposite sex". This item receives the assent of only 15.7% of the 70 principals and is ranked last among the 10 items offered. In view of the fact that the adults' criticism of youths' morality often boils down to an expression of dissatisfaction with their dress and their attitude to sex, one would have expected this to be reflected in the principals' table of priorities, but this is not so.

It is often assumed by the generality of people that to be moral is simply to act in accordance with the norms and prescriptions of the society in which one lives. These norms and prescriptions, in the Nigerian culture, include among others, items like:

(i) the highest deference to, and reverence for, the older person both in public and private - this is manifested in outward behaviours like bowing, genuflection, prostration, and so on;

(ii) the highest reverence or even awe for authority, as for example sprawling and crawling before our natural rulers and chiefs;

(iii) the observance of utmost propriety in matters of sex, especially as between those who are related by blood or covenant, however, distant the relationship;

(iv) living a godly life through observing the rituals that the gods demand through their recognized human agents like the Ifa or Shango priests;

(v) maintaining good interpersonal relationship with others by sharing generously and cheerfully your good fortunes with others starting from your own children to the most distant relations in that order of priority.

(There are many others that one can mention but these are enough for our examples.)

It will be observed that the above examples emphasize overt behaviours, and not much of thinking or ratiocination over what is right or wrong. The cognitive exercise that is involved remains at the level of acquiring the knowledge of the patterns of behaviour through either observing the behaviours to be learned or being orally informed by an elderly member of the family as to what to do or not to do. The more complex cognitive task of reasoning and deciding on the rightness or wrongness of the required behavioural act is almost totally precluded. Indeed, to try to query the propriety or the reasonableness of the expected behaviour is to demonstrate that one has not been properly educated. This is the essence of the adult's complaint - that nothing is any longer sacred to the modern/present generation: they query or choose to disregard the mores maiorum.

In sharp contrast of this Nigerian (traditional) idea of morality and moral education enunciated above is the philosopher-cum-psychologists' viewpoint that moral education is essentially education in how to make personal moral judgments in one's living, how to make moral decisions and act upon them. The strong idea of individualism implied in this does not of course preclude caring for the welfare of the society to which the individual belongs. It is only that the society's norms and prescriptions come second in the scale of priorities, and may be queried or challenged on rational grounds. The ability to form one's own judgment about the reasonableness and morality of the society's traditions and customs, and on the basis of that to reform or reject the offending practices or principles, is in fact what philosophers-cum-psychologists regard as the true moral education. This conception definitely places a premium on intellectuality and rationality in moral decisions and on the individualism that goes along with it; but it does not forget the effective aspect of morality, as for example , the will-power or the "passion" to implement the moral decision that has been taken after rational processes.

It is in the light of these two contrasting viewpoints that we want to discuss the majority opinion of the principals about what moral education is.

It will be observed in the above that the five most frequently selected conceptions of moral education cover both the cognitive/intellectual and the affective/behavioural domains, with the emphasis patently on the overt behaviour. Even though the most frequently selected item on the whole is the one that defines moral education as the inculcation of the habit of disciplining and controlling one's emotions and passions, it is only 12.9% of the 70 principals who consider it important enough to be their first choice. Affording an interesting comparison is the item which was ranked second with 64.3%. This item defines moral education as the inculcation of the ability to distinguish between right and wrong - which is essentially in the intellectual/cognitive domain. 24.3% of the principals checked this as their first choice, in contrast to 12.9% who chose the first item mentioned above. Again 44.3% prefer the former as their first and second choices while 22.9% select the latter as their first and second choices. I think from these it could be inferred that though the principals would like to evaluate moral education through overt behaviour, they regard it as more than merely acquiring some ritualistic patterns of behaviour - they see it as also involving some cognitive or rational element - the ability to reason and decide between right and wrong.

Looking at the types of overt behaviours, the principals also show some discrimination. The traditional Nigerian practice places top priority on obedience to and respect for authority, but the principals rank this item 4 with 61.4%. Perhaps the most striking aspect of it is that only 2.9% make it their first choice for a definition of moral education, when as much as 24.3% make the ability to distinguish between right and wrong their first choice.

This, of course, does not imply that the principals are so enlightened as to make the observance of their school rules and regulations, and the respect for teachers and other school authorities a matter of the individual's idiosyncratic decision. No, I think a reasonable interpretation of their response is that while they would want their students to observe schools traditions and respect their teachers as something reasonable to do, they do not think that teaching it as a specific act is sufficient as content of moral education. I suppose they see moral education more in terms of principles than of specific actions.

At the back of their mind some such reasoning as this might have taken place: if a student learns how to discipline and control his emotions and has learnt how to recognize the right from the wrong - their two most frequently selected definitions of moral education - he is more likely to look at school rules and

regulations as necessary or essential for the peace and harmony of the learning community of which he is a member; and also to see its more experienced and usually older members, i.e. the teachers, as worthy of being listened to, even just as it is reasonable to listen to, and respect, the other person's point of view in any argument.

In fact, that the principals are not as individualistic in their conception of moral education as the philosophers-cum-psychologists is seen in their response to another item in the questionnaire. They were asked whether they would prefer that their students decide and act independently or autonomously, even if wrongly. Only 18.6% of them would encourage such an autonomous type of morality. On the other hand, 81.4% would prefer that their students follow the rules, regulations and traditions laid down whatever their private reservations. Obviously the "autonomous moral judgment" as preached by the philosopher-cum-psychologists appears too anarchistic to the principals in the existential school situation.

The principals would like to see the individual adjust to the whole group, and conform to the common pattern of behaviour. This tendency towards or emphasis on group behaviour in the moral thinking of the principals is further borne out from their reply to the question whether they would prefer to impose collective punishment on students where the culprit could not be easily or conveniently identified. Over 50% of the principals would cheerfully impose such a punishment, with many of them rationalizing that the group is, in fact, also guilty if its members are not courageous enough to point out the culprit.

In summary, the whole of the discussion seems to interpret the principals' conceptions of moral education as falling somewhere between the unmitigated heteronomous conception of the average Nigerian and the seemingly anarchistic, autonomous conception of the theorists.

Finally, a note on the definition of moral education in terms of maintenance of proper relationship with God. This item was ranked only fifth and with only 51.4% on the whole. Does this mean that the principals conceive of moral education only or mainly in secular terms? I think a reasonable answer to this question is that most of the principals including a sizeable number of those in charge of denominational schools appreciate that moral education can be defined other than in religious terms. The four definitions which they ranked above this item indicate that they see it more in terms of interpersonal human relationships on the mundane level than of relationship with some Supernatural Being.

PURPOSE OF MORAL EDUCATION

What then is the nature of the moral education envisaged by the principals for their students? Is it the negative type of emergency reaction? Is it some learning of certain prescribed and sancrosanct moral traditions? In what light do they see moral education? What relationship do they see between the so called moral decadence of the present and moral education?

To determine what the principals see as the true purpose of moral education, a number of options were offered as to why anybody should care for the moral education of students. These options ranged from the completely altruistic and abstract reasons to the crash utilitarian and negative motives. The principals were requested to select and rank three of the preferred items in their order of importance and worthwhileness. The table below gives in percentages their response.

	1st Choice	2nd Choice	3rd Choice	Percentage (total)
1. Moral education is the source and foundation of good citizenship	42.9	35.7	18.6	97.1
2. It is through moral education that respectable personality can emerge	24.3	34.3	18.6	77.1
3. It is in the best interests of youths to be morally educated	17.1	8.6	28.6	54.3

From the above table, it may be concluded that the principals seem to be rather enlightened as to why they should engage in moral education. They talk of it in terms of being "the foundation of good citizenship", and of being the avenue of achieving "respectable personality". It is not surprising that the social advantages of sound moral education should take such a pre-eminent position in their thinking: the principals look on their school as a social unit, and more still as the microcosm of the larger and all embracing society. Viewed in this light, the development of good citizenship starts from being a good member of the school community. Thus, 97.1% of the responding principals select the item which sees the purpose of moral education as the laying of the foundation stone of good citizenship. Out of this percentage, a massive 78.6% select it as their first and second choices - which shows that it is of the highest priority to them.

The item which emphasizes the individual or personal advantage comes next with a differential gap of 20 units. 77.1% on the whole think that the emergence of respectable personalities is the main aim of moral education; while coming a poor third with 54.3% is the item which places the happiness and self-interest of the youth as the main purpose of moral education.

The three most frequently chosen reasons in the above table are practical and positive purposes of moral education, and they receive overwhelming support from the principals. In contrast to them are the items "on the fringe". An item (not included in the table) which puts the aim in a vague and abstract manner was selected by only 3 of the 70 principals i.e. only 4.3% of the principals chose it. Another item which says that moral education is simply to make students stop misbehaving and avoid getting punished - which is a negative reactionary aim - was selected by only 5 i.e. 7.1% of the 70 principals.

That the principals link moral education more to the personality development of the youth than to the bolstering up of some decaying moral fabric is confirmed by their response to another question. Asked to suggest ways of improving moral development of youths, 78.6% of them pick on Guidance and Counselling as a service that every school ought to have for its pupils; while another 64.3% call on the improvement of the emotional stability offered by the home.

Factors responsible for the breakdown in youth morality

However, while the principals believe that moral education should be emphasized as a part of the normal personality development processes even when there is no moral crisis, it does not mean that they too are unconcerned at the moral malaise pervading the whole country. Perhaps they are more concerned than most others because they often see this general malaise translated into concrete acts of indiscipline, violence and vandalism on their campuses. It is understandable then that 87.0% of them attribute the current rash of student indiscipline directly to the inadequate moral education given to the youths. The principals believe, along with others, that there is a moral crisis at least among the youths. Some factors must be responsible for this situation (whether strictly in a causal sense or more loosely in an associational sense). The principals, we suppose, must have an idea of such factors before they can prescribe a remedy or cure.

To obtain the views of the principals on this issue, 10 popularly alleged factors contributing to (if not really causing) the current moral decadence among youths were suggested. The principals were asked to select and rank 5 of them in order of importance. Their response in percentage is given below.

	1st Choice	2nd Choice	3rd Choice	4th Choice	5th Choice	Percentage (total)
1. Breakdown in our traditional value system caused by the assault of foreign cultures on our own	42.9	8.6	7.1	10.0	7.1	75.7
2. Decline in Commitment and devotion among teachers	2.9	10.0	11.4	17.1	14.3	55.7
3. Permissiveness in our child-rearing practices	7.1	8.6	12.9	10.0	10.0	48.6
4. Unprecedented influx of wealth and adults' display of that affluence	5.7	7.1	14.3	11.4	8.6	47.1
5. Youth unemployment in our cities	2.9	11.4	5.7	14.3	7.1	41.4

It is obvious that their overwhelming belief is that the breakdown in morality is attributable directly to the breakdown in our traditional value system due to the assault of foreign cultures on that system. 75.7% of the principals on the whole select this item, and out of this, 42.9% make it their first choice. In contrast, items which give "generation gap" and "innate moral perversity among youth" as the factors responsible for the breakdown of youth morality receive scant support of 14.3% and 15.7% respectively.

It is interesting to note that coming second to the most selected factor is that which attributes moral decadence of youths to the decline in commitment and devotion-to-duty among teachers. Though this factor comes a poor second - with 20 units difference, it is significant that, by selecting it, the principals register their belief that their schools and their teachers are important enough to influence the direction of youth morality. This may appear to be a very optimistic view of the role of the schools, but at any rate it offers a challenge to the schools to do much more than they are doing at the moment.

What are the schools doing at the moment and how adequate is their role? The principals had the opportunity to pronounce especially on the latter. In response to a question on the adequacy or otherwise of the role their schools are playing in the promotion of the moral development of their students, 97.0% assert that their schools are not adequately meeting the moral needs of their pupils and that they could do much better. Only 3.0% feel satisfied with their present performance.

When the principals were asked to suggest ways in which they could improve upon their present performance, there was not a dearth of suggestions. The most frequently suggested step is that the principals, the teaching staff and other authorities of the schools should present themselves as shining examples of sound moral living. This is followed at a respectable distance by the suggestion that more co-operation be developed between the home and the schools - in terms of the usual P.T.A.'s, and of informal contacts between parents and teachers. By making it one of the roles of the schools, the principals, presumably, are saying that the teachers (led by themselves) should take the initiative to promote more active rapport between the home and the school - which is a most welcomed suggestion.

Coming third in the list of their suggestions is that there should be adequate provision of incentive motivation for acts of good conduct or behaviour - through the awards of certificates and prizes, and through the keeping of a roll of honour which one particular principal reported to be most effective in his school. Also frequently suggested are: the establishment of Current Affairs Clubs through which matters of social and moral concern could be debated and judgment formed; the inclusion of moral and religious instructions as specific subjects on the time-table; the establishment and promotion of what one principal has christened "Moral Organizations" - in reference to youth organizations such as the Boy Scouts, Boys Brigade, Hi-Youth Clubs, Youth Work Camps, etc.; and finally making learning more pleasant or at least less frustrating.

All the suggestions above are internal arrangements or internal programmes which the schools could lay on without much help from outside bodies; they cost little or no money to set up, and hence call for no government or "external" aid.

STEPS TO CHECK YOUTH MORAL DECADENCE

To check youth moral decay, however, demands more than the solo efforts of the schools. Remembering that the school occupies only about 8 hours of the child's day, 5 days out of the week, and only about 40 to 45 weeks out of the year; and considering other serious institutional and administrative handicaps that could and do hinder a school from exercising total influence on the growth of the child, there is need for other agencies to be actively associated with the task. These agencies include the government, the home and the adult society in general. They can take some steps of sponsor some programmes which could help in arresting the decay.

To determine what other steps could be taken in this regard, the pages of some of the Nigerian dailies were scouted through (these include the Daily Times, The Sunday Times, The Sketch, The New Nigerian, The Post, and The Observer, and The Tribune). From the prescriptions offered by different correspondents at different times, 13 suggestions for keeping youths in the path of moral rectitude were selected and given to the principals to select and rank 5 of them in order of importance and effectiveness. The results, again in percentage, are as follows:

	1st Choice	2nd Choice	3rd Choice	4th Choice	5th Choice	Percentage (total)
1. Establish Guidance-Counselling in all Schools	25.7	11.4	22.9	11.4	7.1	78.6
2. Conduct direct courses in moral education in all schools	14.3	14.3	15.7	10.0	12.9	67.1
3. Improve the emotional stability of the home	18.6	14.3	12.9	11.4	7.1	64.3
4. Make school education less frustrating	1.4	17.1	10.0	8.6	10.0	47.1
5. Give youths firm moral precepts/maxims to follow	8.6	10.0	10.0	8.6	8.6	45.7

The results show that 78.6% of the principals advocate the establishment of Guidance and Counselling Service in all schools. This is a step that could be taken only by the agency funding the schools i.e. by the government through its Ministry of Education or through the State School Boards.

Coming second with 67.1% is the suggestion that direct courses in moral education should be conducted in schools. This again is an institutional arrangement entailing the training, recruitment and employment of teachers to handle the subject effectively. Once again, it is the government and/or its accredited agencies that could initiate and execute the move to include moral instruction in the syllabus. Lagos State has blazed a trial in this direction.

Not far off in the third place is the appeal to the parents to improve the emotional stability of their homes. 64.3% of the principals indicate that this improved environmental stability of the home will help to arrest moral decadence among youths. This is a task properly laid at the door of the homes in which the children spend the most impressionable periods of their lives, and a sizeable portion of their school days.

It is interesting to note that such macabre suggestions as that "corporal punishment be restored in schools and homes" and the gruesome and sadistic one that "students be lined up to watch public executions by the firing squads" receive scant support - 30.0% and 2.9% respectively and are ranked 7th and 13th respectively in a field of 13.

More interesting, perhaps, is the finding that the principals think less of the influence of religious agencies - the church and the mosque - in arresting youth moral decay. Even though 61.4% of the schools reporting have some religious or denominational affiliations, the suggestions that Religious Knowledge be made compulsory for all students and that Sunday Schools and Koranic Schools (Ile-Kewu) be reinstated for school children receive the assent of only 24.3% and 5.7% of the principals respectively, and they were ranked 8th and 12th for effectiveness in a field of 13.

AGENCIES OF MORAL EDUCATION

Indeed, the inference above that the church and the mosque and such other religious institutions are making inadequate impact on the moral education of students is confirmed explicitly in another section of the questionnaire. The principals were requested to rate seven most popularly recognized agencies or moral education according to their importance and effectiveness. Their response is tabulated below.

	Most Important	Very Important	Important	Hardly Important	Not Important at all
The Home	68 (97.1%)	2 (2.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
The School	16 (22.9%)	44 (62.9%)	10 (14.3%)	0 (0.0%)	0 (0.0%)
Society-at-large	5 (7.1%)	23 (32.9%)	29 (41.4%)	7 (10.0%)	4 (5.7%)
The Church	9 (12.9%)	18 (25.7%)	31 (44.7%)	5 (7.1%)	2 (2.9%)
The Mass Media	1 (1.4%)	26 (37.1%)	29 (41.4%)	5 (7.1%)	2 (2.9%)
The Extended Family	1 (1.4%)	5 (7.1%)	23 (32.9%)	17 (24.3%)	12 (17.1%)
The Peer Group	3 (4.3%)	17 (24.3%)	19 (27.1%)	11 (15.7%)	6 (8.6%)

From the table, it can be seen that the church is ranked 4th, behind the home, the school and even behind the society-at-large as moulders of youths' morality. In terms of quality, while 97.1% rank the home under "Most Important", only 12.9% rank the church as most important.

More revealing still, when the principals were asked, hypothetically to name one of the 7 agencies to which they will prefer to trust the moral edification of their children, if they are restricted to only one agency, 46 (i.e. 88.5%), choose the home; 5 (i.e. 9.6%) choose the church. That is, the principals, now acting in their capacity as parents, would trust the home and the school to effect a better education of their children than the church!

Perhaps some caution is called for in drawing rigid conclusions from the above views of the principals. It is quite possible to read some element of prejudice and institutional rivalry into the response of the principals. If our clergymen were given the same question, we might have the school coming up a poor third, like the church now does in the hands of the heads of schools. The fact, however, that we have 61.4% of the schools with denominational affiliations among our samples seem to undermine the strength of this objection of prejudice, and to support the popular opinion that the church and the mosque, as presently constituted and managed, are not substantially reaching the youths.

This, of course, does not mean that the principals discount the connection between religion per se and morality. It is quite possible for them to be sceptical about the role of the present religious institutions but affirm religion, qua religion, as a cement for morality.

Before closing this section, we must touch briefly on the role of the Ministry of Education as perceived by the principals - since what happens in the school is often the brain-child of "the men from the Ministry". Again, it is an easily recognized fact that the Ministry officials, ranging from the Commissioner to the latest Education Officer recruit, talk much about moral education in schools; but the positive steps that they have taken or the firm and effective leadership offered in this area are what really matter.

In the omnibus questionnaire, the principals were given the opportunity to assess the role of the Ministry of Education vis-a-vis the maintenance of discipline in schools. All the 70 principals, including those at the head of Government schools, accuse the Ministry of failing to give any worthwhile leadership in this direction, and some even accuse it of positively hindering their efforts.

As to the ways in which the Ministry could help them in promoting the moral education of their students, there was not a dearth of suggestions from the principals. We have tried to group their suggestions into five, as follows:

(i) Quick and prompt decision on disciplinary cases referred to them so that whatever punishment is meted out can be immediately related to the "crime" committed.

(ii) Allow more powers of discipline to the school heads and their board of governors, and give them more trust and backing.

(iii) Let the Ministry recruit its Education Officers from those who have spent some time in the classroom so as to make them more realistic as far as school discipline is concerned. At present, Ministry officials tend to be more theoretical and speculative in their approach.

(iv) The Ministry should start to enforce discipline among its own officials - in terms of improving their work-attitudes - then go on to discipline errant teachers, to serve as practical examples to the students. Include assessment of moral character as a criterion in the recruitment and promotion of teachers.

(v) Make the dismissal of a student from one school his dismissal from all schools receiving any grant or subvention from the government. (This is already the case in the South Eastern State, Kwara State, the Midwest and the Rivers State.)

Note: These suggestions are in addition to those already recorded - namely, that the Ministry should re-establish moral instruction as a specific subject in the timetable, (as the Lagos State Government has done), and that every school should be provided with Guidance and Counselling services.

PRACTICAL PROGRAMMES OF MORAL EDUCATION IN SCHOOLS

Our findings so far have been about the opinions which the secondary school principals hold in respect of moral education and how it could be put into practice in schools. This preliminary step is necessary as enabling us to find out what is possible or what could be done, in contrast to what is actually being done at the moment.

All the 70 principals believe that morality is teachable in some form or another, directly or indirectly. However, while only 20 (i.e. 28.6%) of the principals believe that it is teachable directly, like any other curriular subject on their timetable, more than twice that number (44 or 62.8%) believe that it is only teachable indirectly. By the direct method is meant the teaching of morality as a subject in and by itself with its own time-slot; while by the indirect method is meant using other curricular and co-curricular activities to draw attention to their moral issues, with a view to learning morality from them. The table below shows the proportion of support for direct and indirect methods of teaching morality.

Type of Schools	Teachable Directly	Teachable Indirectly	Teachable Directly and Indirectly
Schools with Disciplinary Problems	8	23	2
Schools without Disciplinary Problems	12	21	4
Total	20 (28.6%)	44 (62.8%)	6 (8.6%)

The table above shows what the principals believe about the teachability or otherwise of morality: but what, in fact, do they do to teach it? What programmes do they set up? How do they use the opportunities available? And with what results? These are some of the questions that we will be trying to answer in the following paragraphs.

Our analysis of the data reveals that while all the 70 principals in the sample believe that morality is teachable directly and/or indirectly, only 53 say they have concrete programmes of any type to teach it. This response can be interpreted to mean that only 53 either have specific time-slots in their timetable,

or consciously use other curricular and co-curricular avenues to inculcate moral education, or both. This is because there is no school that does not have curricular disciplines and co-curricular activities which are capable of being used to teach morality indirectly, but it is another thing for the teachers of the subjects or the organizers of the co-curricular activities to see and exploit the possibilities of the activities for moral education purposes. Conversely, those 17 principals who indicate in their questionnaire forms that they do not have any concrete programmes of moral education will be interpreted to mean that they do not consciously or overtly use the school activities concerned for moral edification.

Out of the 53 schools with programmes of any type, only 23 report having specific time-slots for moral education as a subject like any other curricular subjects. 15 of these devote one hour or more per week to the subject, while 8 accord it only 30 to 40 minutes a week. When one examines the content of their moral education as a subject, however, it is discovered that the vast majority of the 23 with specific time-slots indicate Religious Knowledge/Religious Studies as the content of the subject. The same majority indicate that the principals themselves or the Religious Knowledge teachers handle the subject. This is to say that the principals concerned identify Religious Knowledge/Studies with Moral Education: a course in religious education is a course in moral education.

This identification is, of course, a dubious one because, as many knowledgeable scholars in the field of religious education have rightly pointed out, the aims of religious education are not synonymous with those of moral education - the subjects have different logics of approach and different ends in view. (See especially M.V.C. Jeffreys: Religion and Morality 1967, and Edwin Cox: Changing Aims in Religious Education 1966).

Again, anybody tolerably familiar with the way that the RK/RS/RI is handled as a subject in the Nigerian Secondary Schools will testify to it that the moral dimension of the subject is hardly brought out. The students usually read up the subject for the cognitive and academic purposes of passing examinations. It is even only a matter of chance if any truly moral or religious emotion is experienced by the students in the course of the reading. And, in any case, in a pluralistic society such as Nigeria is, it will be highly improper for the RK/RS/RI curricular subject to be used for proselytization or conversion, be it from Christianity to Islam, or vice versa as it often used to be. Thus Religious Knowledge cannot be equated with moral education on the timetable, and we cannot therefore conclude with any confidence that the 23 principals who reported having specific time-slots for moral education do indeed have periods meant only and only for moral education purposes.

The next question then is: if we cannot even assert that the 23 principals out of 70 do indeed have specific time-slots for direct moral education, why is this so? Only 23 say they have specific programmes out of the 53 who assert that it is teachable. Why do the remaining 30 not put up programmes to teach it, when they believe it is teachable?

To answer this, we asked the principals concerned to give a number of reasons why they did not include Moral Education as a subject in their timetable when they believe it is teachable. The response was:

We have no programme because:

1. Moral Education is present in every activity of the school; it is an inseparable part of everything (37);

2. Moral Education does not lend itself to factual/formal teaching as maths, history, science etc. (24);

3. Morality is caught, not taught (21);

4. No specific/defined area of study or body of knowledge called Moral Education (21);

5. It may degenerate into indoctrination or parade of bigotry by the instructor (18); and

(6) The timetable, as it is, is too crowded to include it (15).

Though we have included here the ranking of only six most frequently adduced reasons, there are some other interesting and revealing reasons worth mentioning. For example, some principals say that they do not have specific time-slot for moral education because, as a specific subject, "it will not be examinable" i.e. it will be problematic to assess or evaluate the product, e.g. should the "morally educated" product be judged by his behaviour or merely by paper and pencil tests?

Another group of principals exclaimed that it would require an Angel to teach it! Two of the principals, however, went out of their way to label the Ministry of Education as the stumbling block to their efforts to set up moral education programme. They did not say specifically why or how, but we may be reminded that all the 70 principals have passed adverse comments about the Ministry in terms of its lack of leadership in this aspect and in terms of even positive hinderance in the maintenance of discipline in schools.

Programmes of Indirect Moral Education

We have discovered that a majority of the principals believe that moral education is an on-going aspect of education which must be an intrinsic part of the whole school activities, and not an isolated or discrete part. (As a side comment, it should be remarked that this commonsensical view that moral values must be taught "holistically" i.e. through every curricular discipline need not prevent the inclusion of a specific time-slot for moral education with its own peculiar content and logic of approach. The two of them could go on pari passu to the advantage of the student.)

Since many principals believe, however, that the indirect method is the only feasible way of teaching the subject, it will be of interest to find out how they do, in fact, use the school activities to achieve their set-out objectives, and with what success.

The school, both as an academic institution and a social unit, offers immense opportunity for the development of moral character; and this opportunity comes at a time when the youths are experiencing what Eric Erickson has called the "Identity Crisis", and are therefore in need of guidance and direction. It is thus essential that all the various activities of the school be examined to see how and to what extent each of them promotes the moral development of students who participate in them.

For the purpose of finding out this, through the help of relevant literature a list of 20 school activities were identified and presented to the principals as an item in the omnibus questionnaire. These 20 activities have been found to be contributive to the moral development of students if the teachers or organizers took the trouble to use them as such.

The 20 activities were divided into 4 categories or headings thus:

(i) The Curricular Offerings i.e. the formal school subjects or disciplines.

(ii) The co-curricular activities, like sports and games etc.

(iii) The Administrative activities e.g. Prefectship, Captaincy etc.

(iv) The Socio-Moral organizations e.g. Boy Scouts, SCM, etc.

Each category contains 5 activities in which students generally participate.

The principals were then given 5 columns for the degrees of effectiveness of each activity which they have in their schools. The degrees range from the "Most Effective" to the "Not Effective". The principals were asked to check which activity existed in their schools as well as the degree of effectiveness of the school activity identified. The series of tables below present the results in terms of the total number of schools which in fact use the activities consciously for the purpose of moral edification, and of the degree of effectiveness.

1. The Curricular Offerings i.e. Subjects/Disciplines

The academic subjects are often regarded as good sources of teaching indirectly some form of moral education. Every teacher, it is often claimed, seeks to teach his subject with some intellectual integrity, and demands from his students honesty and objectivity in answering questions. That is, the teaching and learning situation is a moral one, and the method must indeed be moral.

More significantly, however, certain subjects or disciplines have been identified as very potential sources of moral education, and as helping to develop certain skills needed for making moral judgments.

For example, Mathematics is deemed good for the development of logical reasoning. The ability to make "objective" historical judgment, which is the purview of history to develop is regarded as not too different from the ability to weigh facts and make moral judgments on the basis of evidence at hand; and the humanistic subjects, especially the aesthetic subjects, deal with the development of sensitivity - a quality also very much prized when one is making a moral judgment.

But, more directly still, some subjects do offer opportunities of coming across instances of moral situations needing moral decisions, of making moral judgments for oneself, and so on. Such subjects include Social Studies, Civics and Religious Knowledge. Here case studies can be made of instances of morality. (Social Studies and Civics are mentioned separately because the former is a relatively new arrival in the curriculum of Nigerian secondary schools and is, in fact, not yet widespread. It is gradually replacing the old Civics which also is not as popular in schools as one would have thought or expected. It is to be hoped that more and more schools will adopt the new Social Studies which devotees are making strenuous efforts to build into a discipline as rigorously academic and demanding Mathematics or the Languages.)

On the whole, from a galaxy of academic subjects in the schools, I have selected 5 that are most intimately connected with human beings and that most readily lend themselves to the teaching of morality, even if only as a second fiddle to the main logic of the discipline concerned. They are: Literature, History, Social Studies, Civics and Religious Knowledge. The results of the findings are as follows:

Subjects/ Disciplines	Most Effective	Very Effective	Effective	Hardly Effective	Not Effective at all	Over all No. & % of schools using it
Literature	4 (7.0%)	15 (26.3%)	24 (42.1%)	10 (17.5%)	4 (7.0%)	57 (81.4%)
History	1 (1.9%)	8 (15.4%)	26 (50.0%)	14 (26.9%)	3 (5.8%)	52 (74.7%)
Social Studies	3 (9.4%)	11 (34.4%)	10 (31.3%)	8 (25.0%)	1 (3.1%)	32 (45.7%)
Civics	4 (13.8%)	14 (48.3%)	9 (31.0%)	2 (6.9%)	0 (0.0%)	29 (41.4%)
RK/RS	19 (28.8%)	19 (28.8%)	16 (24.2%)	6 (9.2%)	6 (9.2%)	66 (94.3%)

The table above shows that 4 (i.e. 7.0%) of the 57 principals who have and use literature as a means of fostering the moral development of their students find that subject most effective, 15 find it very effective, 24 find it effective, 10 hardly effective, and 4, not effective at all. Altogether 57 (i.e. 81.4%) of the 70 schools reporting say that they have and do use the subject for moral education purposes.

One or two comments are called for. It is interesting to note:

(i) that 66 or 94.3% of all the sampled schools report Religious Knowledge/Studies as existing on their timetables and as being used for moral education;

(ii) that of this number, 38 find it most effective and very effective. That is, 57.6% accord it a high degree of effectiveness, placing it in the two highest columns.

This high percentage is not too difficult to explain. All schools with denominational affiliations are likely to report the subject as the best medium of moral education, and again devoted Christian or Muslim principals are likely to regard it as a good way of teaching morality if it is on their timetable. Generally it is on the timetable of almost all, if not all, the secondary schools in Nigeria because it is regarded by students as a "soft" option in their West African School Certificate Examination. This, of course, is not to say that all candidates pass this subject at all or pass it in flying colours. Some factors like bad teaching, unqualified teachers, and students' carefree and indifferent attitudes often result in failures for some students and low grades for many more.

2. Co-Curricular Activities

By these are meant activities which may or may not appear specifically on the school's timetable, but which, in fact, are usually engaged upon by students and are regarded as part of the educative experiences that the students acquire in schools. They are activities in which surely but almost imperceptibly the moral character of participants is built up. Most schools have most of them but it is possible for some principals not to see some of the activities as contributing anything to moral education or to the ability to make objective moral judgment. Included in this category of activities are: Dramatic Clubs staging plays, especially

morality plays, in which the participants cannot avoid taking sides and passing moral judgments; Scouting, Girl Guides, Boys Brigade, Red Cross and such other youth social organizations in which the ideals of altruism, co-operative spirit and selfless service are stressed; athletics and games in all their varieties, in which the virtues of honesty, impartiality, courtesy and self restraint are often stressed in addition to other physical (health) and social benefits; community voluntary services rendered regularly or periodically to the community in which a school is located - this is more in practice in the rural areas where most teachers and most students reside in the villages nearest to the schools, but less evident or not existing at all in most big urban schools; and finally the Student Representative Council (SRC) (or whatever passes for that in other schools) which 50% of the principals report as existing in their schools and in which students can play actual roles in social organization and self-government. Participation in such activities as are included in this category often help in promoting the student sense of social-responsibility, of healthy respect for law and due regard for others.

The findings in this category of activities are as follows:

Co-curricular Activities	Most Effective	Very Effective	Effective	Hardly Effective	Not Effective at all	No. & % of schools using it for ME
Drama	5 (16.1%)	8 (25.8%)	16 (51.6%)	1 (3.2%)	1 (3.2%)	31 (44.3%)
Scouting, Girl Guides, Red Cross etc	3 (6.7%)	16 (35.6%)	24 (53.3%)	2 (4.4%)	0 (0.0%)	45 (64.3%)
Athletics, Games & Sports	2 (3.4%)	22 (37.9%)	28 (48.3%)	4 (6.9%)	2 (3.4%)	58 (82.9%)
Community Voluntary Service	2 (7.7%)	10 (38.5%)	12 (46.2%)	2 (7.7%)	0 (0.0%)	26 (37.1%)
Students Representative Council	6 (17.1%)	11 (31.5%)	13 (37.1%)	5 (14.3%)	0 (0.0%)	35 (50.0%)

One or two points in the above table: it is interesting to note the scanty number of schools which have used Voluntary Service as a means of building up the sense of social responsibility of their students. This is perhaps not surprising in view of the fact that most schools are located in the urban areas where people look to the Town or City Council or even the State Government to provide all the community welfare services. The maintenance of the narrow road leading to the school may be regarded as the responsibilty of the Government. Even in the rural areas where the government is not readily available, this virtue of community service is regarded as an "old virtue" and not in line with the modern fashion! Hence labourers may be hired to clear even the schools surroundings, and since many teachers routinely go to their village schools from the town every day, there

is not that personal involvement in the village life which can induce them to make their students engage in community services.

A second point is about the Students Representative Council which only 35 (50.0%) of the responding principals report as existing in their schools. It is surprising that as many as half of the principals do not much appreciate the influence of peer-groups as enforcers of sanctions against infringement of the rules and regulations to which they subscribe. Also, the advantages of participation and involvement which ultimately result in a deep sense of belonging and the avoidance of alienation are not realised and not exploited by many of our principals. Student Representative Councils can be very instrumental in identifying qualities of leadership in students and of promoting their social responsibility.

3. Student-Centred Administrative Arrangements

There is no gainsaying that the tone of a school as set by the principals in collaboration with the members of his staff, as well as the forceful examples of morality displayed by both of them, are most influencial in promoting the moral development of students under their care. These are, however, a set of institutional or administrative arrangements which indeed set the pace of morality in the schools but in which the students directly have no part to play. Under the above heading, however, we want to focus our attention on those aspects of the administrative set ups in which the students actively participate and through which they develop their moral potentials.

Under this category, we include the school prefect, the form captain and the monitor systems; some disciplinary committee in which, at least, some students are represented especially where cases involving fellow students are being discussed; some staff-student welfare meetings in which problems of general welfare of all students (not just the chastisement of delinquents) are aired and discussed - regularly or occasionally; and guidance and counselling services. The last item may be run by specialist counsellors when they are available but, as evidence will show, this is only in very few schools; where they are not available teachers with some training in psychology and who have interest and the patience to study, understand and tackle youths problems may render these services. Guidance and counselling is under this category of student-centred activities because the therapy sessions are basically face-to-face, interpersonal interactions in which the students as the clients, actively participate.

The results of the findings under this category are as follows:

Administrative Activities	Most Effective	Very Effective	Effective	Hardly Effective	Not Effective at all	No. & % of schools using it
Guidance & Counselling	6 (26.1%)	11 (47.8%)	5 (21.7%)	1 (4.3%)	0 (0.0%)	23 (32.9%)
Prefect System	2 (3.5%)	8 (14.0%)	37 (64.9%)	9 (15.8%)	1 (1.8%)	57 (81.4%)
Captain/ Monitor System	2 (4.0%)	4 (8.0%)	26 (52.0%)	18 (36.0%)	0 (0.0%)	50 (71.4%)
Disciplinary Committee	1 (2.5%)	10 (25.0%)	19 (47.5%)	8 (20.0%)	2 (5.0%)	40 (57.1%)
Staff-Student Welfare Board	3 (12.5%)	11 (45.8%)	7 (29.2%)	3 (12.5%)	0 (0.0%)	24 (34.3%)

4. Socio-Moral Organizations

The fourth and the last category of school activities to be considered is that which I have given the label "Socio-Moral" organizations. These include religious oriented clubs and societies like the SCM, the Catholic Youth Organization, Bible Study Groups, the Ahmaddiyah Youth Societies, and such other societies and clubs whose purview goes beyond the narrow theoretical study of the "holy books" to the actual practice of living the ideal life portrayed in those books. Also included are social and religious observances like the Morning and Friday Afternoon Assemblies, the Morning devotion, the Friday Islamic Services (the Jimo'h), the Sunday Schools and periodical 2 minutes of silent meditation (often observed in Roman Catholic Schools). There are also the Current Affairs discussion group known by different names in different schools. These may include the literary and debating society. Finally, many schools prepare handbooks/pamphlets containing the school rules and regulations and trying to inculcate especially in the new students the ethics and the traditions of the schools. Others call them the "Code of Conduct" books etc. They are included here more for want of a more suitable category because only in very very few enlightened schools do the students participate in drawing up such codes. Of course, it is also the responsibility of the students and especially their officials to see to the observance of the rules, regulations and traditions contained therein.

The results of the findings on the activities under this category are as follows:

Socio-Moral Activities	Most Effective	Very Effective	Effective	Hardly Effective	Not Effective at all	No. & % of schools using it for ME
Current Affairs Groups	6 (26.1%)	8 (34.8%)	8 (34.8%)	1 (4.3%)	0 (0.0%)	23 (32.9%)
Socio-Religious Clubs	7 (11.9%)	25 (42.4%)	23 (38.9%)	3 (5.1%)	1 (1.7%)	59 (84.3%)
Sunday Schools/ Jimo'h	4 (9.8%)	11 (26.8%)	19 (46.3%)	5 (12.2%)	2 (4.9%)	41 (58.6%)
Morning Assemblies	5 (8.3%)	19 (31.7%)	25 (41.7%)	7 (11.7%)	4 (6.7%)	60 (85.7%)
Book of Code of Conduct	0 (0.0%)	7 (18.4%)	16 (42.1%)	13 (34.2%)	2 (5.3%)	38 (54.3%)

The Index or the degree of effectiveness

Even though an X number of schools may report that they use a particular activity as an indirect source of moral education, yet we still need to know how effective each of the activities is as a whole or on the average. That is, we want to know which activities are found to be most effective on the whole and which, as at present taught, are assessed to be least effective.

For this purpose, the degrees of effectiveness were quantified in which "Most Effective" is weighted 4 points; "Very Effective" 3 points; "Effective" 2 points; "Hardly Effective" 1 point; and "Not Effective" with zero point. By multiplying the quantitative points alloted to each effective column by the number of people checking that column, and adding up all the 5 columns for each activity, we get the total points scored for that activity. By dividing this total points by the total number of people who checked that activity, we get the average point of effectiveness for the activities. We may express this by the formula:

$$\text{Index of effectiveness} = \frac{\sum (4a + 3b + 2c + d + 0)}{\sum (a + b + c + d + e)}$$

Where a = No. of principals checking the "Most Effective" column
b = No. checking the "Very Effective" column
c = No. checking the "Effective" column
d = No. checking the "Hardly Effective" column
e = No. checking the "Not Effective" column

Take Literature as an example: 4 principals say it is most effective. Since "Most Effective" is scored at 4 points, Literature has (4 x 4) = 16 points under "Most Effective".

Under "Very Effective" which is checked by 15 principals, the total points under this are (3 x 15) = 45; under "Effective" which is also checked by 24 principals the total points are(2 x 24) = 48; under "Hardly Effective" which is scored by only 10 principals, the total points are (1 x 10) = 10; and since 4 principals found it "Not Effective" at all, the point under this column is (0 x 4) = 0, since if it is not effective at all, it is as good as not existing on the timetable as far as the indirect moral education is concerned. Thus the total points for Literature $= \sum (16 + 45 + 48 + 10 + 0)$

= 119 points, scored by $\sum (4 + 15 + 24 + 10 + 4) = 57$ principals.

When the total points are divided by the total number of principals, we have the average degree of effectiveness which is $\frac{119}{57} = 2.1$

This means that Literature comes up only in the average or medium range of effectiveness.

Using this calculation for all the activities, we have the following results presented in the descending order of effectiveness:

List of Subjects	No. of schools having & using for MI in the timetable	No. of schools not having or not using for MI in timetable	Index/Average degree Effectiveness of Usage
Guidance & Counselling	23 (32.9%)	47 (67.1%)	3.0
Current Affairs Period	23 (32.9%)	47 (67.1%)	2.8
Civics	29 (41.4%)	41 (58.6%)	2.7
RK/RS	66 (94.3%)	4 (5.7%)	2.6
Socio-Religious Club	59 (84.3%)	11 (15.7%)	2.6
Staff/Student Welfare Committee	24 (34.3%)	46 (65.7%)	2.6
Community Voluntary Service	26 (37.1%)	44 (62.9%)	2.5
SRC	35 (50.0%)	35 (50.0%)	2.5
Drama	31 (44.3%)	39 (55.7%)	2.5
Scouting/Girl Guides etc.	45 (64.3%)	25 (35.7%)	2.4
Athletics/Sports	58 (82.9%)	12 (17.1%)	2.3
Social Studies	32 (45.7%)	38 (54.3%)	2.3
Sunday School/ Mosques	41 (58.6%)	29 (41.4%)	2.2
Morning Assembly/ Meditation Hour	60 (85.7%)	10 (14.3%)	2.2
Literature	57 (81.4%)	13 (18.6%)	2.1
Prefect System	57 (81.4%)	13 (18.6%)	2.0
Disciplinary Committee	40 (57.1%)	30 (42.9%)	2.0

List of Subjects	No. of schools having & using for MI in the timetable	No. of schools not having or not using for MI in timetable	Index/Average degree Effectiveness of Usage
Captains/Monitors	50 (71.4%)	20 (28.6%)	1.8
History	52 (74.3%)	18 (25.7%)	1.8
School Handbook/ Code of Conduct	38 (54.3%)	32 (45.7%)	1.7

Obviously, some comments are called for because of some surprising results. First, there is the RK/RS which has often been touted as the avenue, par excellence, for the teaching of morality. 66 of the 70 schools polled have it as a subject on their curriculum. We have seen above that some even claim it as the equivalent of their moral education programme. The way it is often talked about, one would have expected it to score highest on the index of effectiveness, but really it is in the 4th position with an index of 2.6. That is, it lies between ordinarily "Effective" & "Very Effective". In the same range of effectiveness are other religious-oriented activities like Socio-Religious Clubs e.g. SCM with 2.6, Sunday School/Koranic Schools with 2.2, and Morning Assembly and Meditation Hours with 2.2. Thus, while religious activities are regarded by our principals as promotive of good moral character, they are not ready to rank it the best or the highest source, nor to regard it as the lowest.

The highest index of 3.0, which places it in the column of "Very Effective", is reserved for Guidance and Counselling. Though this is a new service that is available only in very few schools (23 out of 70 schools polled), yet it has been found by those who have it as most helpful in the personality development of their students. This goes to confirm our earlier finding, under the principals conceptions of moral education, that the principals see the problem of moral education, more in socio-psychological terms than in metaphysical-religious idiom. Morality stays at the level of human personal interaction - which may of course be sanctioned by some supernatural agency, but it is not first and foremost the structuring of the relationship between man and his god.

The curricular disciplines have not fared too well either. History and Literature are usually supposed to present students with cases of moral dilemma in which the students are called upon to form their own judgments and take sides, and in general experience the dilemma emphatically. Yet History has an index of only 1.8 and Literature 2.1. Civics and Social Studies fare better most probably because the topics discussed in them are current and do affect the students more immediately. The "lessons" of history and literature are rather remote in points of time and the personality involved. We are not surprised, then, that Current Affairs period recognized by only 23 of the 70 schools receives the second highest weighting of 2.8.

On the disappointing side are the Prefectship, the Captaincy, the Monitorship, and the issuance of Schools Handbooks or Schools Code of Conduct. The principals find them not as helpful in character formation as many people would have thought. In any case, the table has revealed to us those school activities which the principals found to be sources of moral education, and the degree of their effectiveness.

SUMMARY AND CONCLUSION

Even though extensive discussions and commentaries have taken place simultaneously with the analysis of the data, it is necessary to draw the loose ends together so as to focus on the salient points for emphasis. It can scarcely be over-emphasized that the interpretations and the conclusions drawn, even though expressed in positive terms, have to be taken with caution in view of the percentage of questionnaire returns noted earlier.

These then are some of the highlights in our findings:

(i) Our investigation of the principals' conception of moral education reveals that they conceive of it more in terms of interpersonal relationships than of observance of relationship with some supernatural being. They see it as the process of developing the social dimension of human personality.

(ii) While moral education should be a normal part of the student's personality formation and therefore to be approached more positively, it was discovered that the schools, the home, and the Ministry are, so far, playing inadequate role in the moral education of students.

(iii) We discovered that even though all the principals believe that morality is teachable somehow, a majority believe that it is only teachable indirectly; that is, as a by-product of other school activities. Only a few believe it is teachable directly and only a few have any such programme of moral education. When we examined the content and the personnel involved in the teaching, we discovered that the direct programmes referred to are in almost all cases religious education courses, which are not strictly direct moral education courses.

(iv) Majority of the principals believe that moral education can be done only indirectly and report that some of their schools' activities are used to this effect. We examined a number of such school activities and some of the highlights in our findings include the discovery that the Religious Knowledge or Religious Instruction so much touted as the avenue of moral instruction has only a medium range of effectiveness as an avenue of moral education in schools. On the other hand, guidance and counselling claims pride of place as the most effective way of promoting students moral development. It was found also that making the student participate in current socio-moral discussion groups also rates highly in its impact on student development of the moral sense. Unfortunately, it was discovered that only very few schools have these two avenues that have been found very effective by those who have them. Only 23 out of the 70 schools polled have either of the two most effective avenues, whereas as many as 66 out of the 70 have Religious Knowledge which has only a medium range effectiveness.

(v) Even though the degree of effectiveness of each subject as a source of moral education has been noticed, it is pertinent to observe that the subjects are not as fully exploited for their moral potentialities as they should. The argument is familiar enough: mathematics, history, and science have their own logic or methods of approach different from the logic of morality, and so the subject should not be prostituted to serve other ends. The argument looks strong enough but in this day and age when the emphasis is on helping the child to operate in his environment, the apostle of purism in disciplines cannot escape the call for relevance.

Even if the logic of a particular discipline takes the first priority of the specialist teacher, that aspect of his subject which touches most closely on human life should also receive substantial attention. The moral dimensions of curricular subjects should not be just by-products but rather should be regarded as highly as any other aim of the discipline.

(vi) Finally, even though only a few believe in a direct moral education course, there is a mounting evidence that it is teachable as a course by itself with its own content and logic. Such a direct course need not absolve other teachers of the responsibility to emphasize the moral connotations of their subjects. Rather, a multi-disciplinary or cross-disciplinary approach in which the moral education teacher with his expertise, explores moral issues with teachers from other disciplines will be most fruitful.

Future line of research should therefore be directed towards deeper exploration of the potentiality of each school activity, especially the curricular disciplines, for developing the moral capacity of the students; and towards the investigation of the possibilities of direct moral education and the design of a viable, teachable, and, if necessary, examinable syllabus, not only for secondary schools but equally important for Teachers Colleges.

CROSS-CULTURAL STUDIES OF MORAL JUDGEMENTS AMONG PUPILS AND STUDENTS

Michael Stanton, School of Education
The University of Birmingham, Birmingham

Two cross-cultural studies of moral judgements are reported. The first was carried out among more than six hundred secondary school pupils in Guyana, Anguilla, Nigeria, Ghana, Cameroon and England. The second was carried out among more than four hundred College of Education students in Nigeria, Mauritius, Jamaica, Grenada and England. Males and females were included in each national group, apart from Jamaica, where only females were involved. It was thus possible for intra-cultural comparisons to be made in all but one of the countries.

Subjects were asked to judge a number of actions carried out by others. Actions to be judged were adapted from earlier enquiries by the author and, in the case of the first study, were submitted to heads of schools concerned for comment. Items were thus initially considered by local judges. Responses were made anonymously, on a scale. It should be emphasised that it is necessary to distinguish between a judgement of an action, which reflects expectations of behaviour and the reasoning which may be elicited as a justification for the judgement. Since the enquiries referred to here were non-funded personal studies it was not possible to engage in the very extensive field-work necessary to ascertain the forms of reasoning underlying judgements. It was, however, suggested that it was desirable to separate judgements from reasoning about moral behaviour since the latter may, to a considerable extent, reflect general cognitive functioning not necessarily involved in making judgements in everyday situations. The approach adopted by Kholberg (1963) in presenting moral dilemmas that were far removed from everyday experiences of secondary school pupils was criticised on the grounds that the kind of reasoning evoked, as well as the judgement made, would not reflect responses in realistic situations.

Pittel and Mendelsohn (1966), in a review of literature in the field, concluded that there have been a number of weaknesses in research in moral values. Too much emphasis, they suggest, has been placed on moral abstractions rather than behaviour in realistic contexts, and scoring procedures often utilize preconceived ideas of 'right' and 'wrong'.

The main approaches observed in the studies reported, based on earlier work by the present author are summarized below:

1. Realistic forms of behaviour were presented in items to be judged.

2. Negative actions were balanced by those that were positive, involving concern for others.

3. The subject selected a point on a scale : responses thus established the 'rightness' or 'wrongness' of an action.

4. The design enabled comparisons to be made between alternative forms of some actions, e.g. giving more or less to charity.

METHOD

In the case of the first study respondents answered questions in three sections, dealing respectively with actions by adults, adolescents and children. Some items were included in more than one section and some related to different forms of the same kind of behaviour, e.g. giving more or less to charity or stealing more or less money. It was thus possible to make comparisons between judgements of behaviour between sections and different levels of the same kind of behaviour within sections.

In the second study the subjects, college students, were asked to assess twenty-eight actions carried out by someone of their own age and sex. Some items, relating to giving money to charity or stealing money, were similar to those in the first study and others, like having sex experience before marriage or respecting others' religious viewpoints, were included as being age-appropriate forms of behaviour. It was emphasised that there were no special circumstances relating to actions being judged unless these were specified. Stealing, for example, was for personal gain and not because of a pressing need.

ANALYSIS

Methods of analysis were similar for both studies. Males and females in each national sample were considered independently. Data relating to each male or female group were intercorrelated. Where appropriate, it was then possible to see correlations for judgements of different forms of similar behaviour. Comparisons between males and females in each country were then made for each variable, using tests. The third stage of analysis was the comparison between assessments for each variable, by males and females respectively and in all countries, by means of analysis of variance. Main conclusions arising from the analysis of each study are summarized below.

Study of Secondary School Pupils

1. Comparisons between males and females within each country produced very few significant differences, indicating that expectations in a culture tend to make for a comparatively high level of agreement for subjects of this age.

2. There was a tendency for judgements by males of positive behaviours to be lower and judgements of negative behaviours to be higher than those for females.

3. Cross-cultural comparisons for males and females respectively showed agreement for only a limited number of behaviours. The contrast between the high level of intra-cultural agreement and variations in cross-cultural responses indicated that a considerable number of judgements are influenced

by culture-specific factors.

Study of College Students

1. There was considerable agreement cross-culturally in ranking behaviours judged as being most undesirable but not in ranking those judged most desirable.

2. Correlations showed that there was consistency for judgements of each male and female group for giving small or large amounts to charity, stealing small or large amounts of money and helping the elderly in different circumstances. In contrast there were few significant correlations in ratings for cheating in different circumstances (in a game and in a test) and between stealing from a shop and keeping excess change when shopping.

3. In comparisons between sexes in the four countries concerned there were a number of intra-cultural differences between English students but few such differences in other countries.

4. Comparisons between all the male and female groups respectively, using analysis of variance, showed that universality of judgements was comparatively limited.

DISCUSSIONS

Since the main purpose of these investigations was to ascertain the extent of cross-cultural agreement the relative positions of groups in assessing various behaviours has not been discussed. The researcher's task, it is suggested, is to show how far agreement exists between groups and not to infer that there are established criteria that would enable him to conclude levels of 'rightness' and 'wrongness' that could be used as yardsticks in comparing different cultures.

Various investigators have concluded that changes in items presented produce changes in research results (e.g. Piaget, 1972). The second study, which had a number of items that were different from those in the first, was presented to older subjects. Although, as would be expected, there are a number of differences there are also a number of conclusions common to both studies. Conclusions from both studies strongly indicated that cultural influences affect levels of expectations for a number of behaviours. In the study involving college students there was less cross-cultural agreement among females than males and among females considerably more agreement for negative than positive behaviours. Thus, within the context of levels of agreement shown there are variations between sexes as well as for particular kinds of behaviour.

There would appear to be justification in using realistically-based items that are designed to elicit judgements of real-life situations. Since it is not possible to make projections about desirable behaviour from responses to those that are negative a study should include items that are approved and disapproved by society. Because some responses relate to widely-held views and others may be the outcome, to a greater degree, of independent interpretation there is doubt about the validity of summing scores arising from judgements of behaviour having differing levels of salience for

individuals. In order to distinguish between a judgement related to social expectations and the reasoning underlying this judgement it would seem desirable to use brief concise questions as in the studies reported. The more sophisticated research required to ascertain related reasoning could then form a separate part of the work or be dealt with in a separate study. It would then be possible to compare judgements with reasoning and ascertain their relationship. Considerations arising from these observations would imply the possibility of changes in stage-theory as applied to the development of moral judgement during adolescence. If, as suggested, there are no longer grounds for summing of scores the focus could well be directed to an interpretation based on forms of related actions consisting of categories of behaviour.

Several studies (e.g. Feather and Hutton, 1974; Bronfenbrenuer, 1974) conclude that there are differences in values between countries due to cultural variables. Investigations of this kind are particularly important in bringing attention to ways in which cultural diversity may provide opportunity for varying expectations of some forms of social behaviour. Evidence from these researches is consistent with a main conclusion of the studies reported above, that there appears to be little justification for postulating the universality of stages, as claimed by Kholberg (1974). Universality implies that research procedures have adequately established a discreet factor, 'morality', that is not influenced by a wide range of cultural and environmental variations and expectations. In practice universality would place the emphasis on assumptions of common expectations of moral and social behaviour and so look for common approaches in moral education instead of emphasising the need to analyse varying situations to understand the nature of features making for intra and cross-cultural differences. The outcome of such analysis and understanding could then, it is suggested, provide the basis for policy designed to meet specific needs.

REFERENCES

1. Bronfenbrenuer, U., Two Worlds of Childhood, Russell Sage Foundation, New York, 1970.

2. Feather, N.T., and Hutton, M.A., International Journal of Psychology No. 9, pp. 91-104, 1974. Value systems of students in Papua New Guinea and Australia.

3. Kholberg, L., Vita Humana No. 6, pp.11-33, 1963. The development of children's orientations towards a moral order.

4. Kholberg, L., Adolescents, E.D. Evans (Ed.), The Dryden Press, Illinois, 1970. Moral development and the education of adolescents.

5. Piaget, J., Human Development No. 15, pp.1-12, 1972. Intellectual evolution from adolescence to adulthood.

6. Pittel, S.M. and Mendelsohn, G.A., Psychology Bulletin No. 66, pp.22-35, 1966. Measurement of moral values: a review and critique.

The first study reported has been published as follows:

7. Stanton, M., Educational Review No. 27, pp.126-137; 1975. Pupils' assessments of social actions: a cross-cultural study.

The second study is being prepared for publication.

COGNITIVE STUDIES WITH STUDENTS IN PAPUA NEW GUINEA

Mr. J. Jones, Educational Research Unit,
University of Papua and New Guinea

INTRODUCTION

Students in Papua New Guinea experience considerable difficulty in dealing with much of the work to which they are subjected. This is true for all disciplines, but is probably most clearly marked in the areas of science and mathematics. While a simple recognition of this state of affairs is an important first step toward any ultimate solution, it is not enough. To say that someone has "difficulty with mathematics" for example is to make a very broad statement. The ability to achieve some acknowledged level of excellence in mathematics is dependent upon a large number of more basic skills of a cognitive nature. An important factor in any achievement situation is an individual's motivation; however, no amount of motivation can compensate for a lack of the necessary cognitive apparatus. For this reason, the present discussion is confined to cognition - or thinking.

During 1972 a series of pilot studies was carried out in various secondary and tertiary institutions: the aim of these was to take a first broad look at students' basic difficulties, and also to develop a set of testing procedures which could be used in a wider context. Some of these studies have already been described in fair detail while others (generally of a more limited and inconclusive nature) have not been reported in print. A very brief description of some of these studies, and the main results, is given below.

(a) A battery of tests dealing with the concept of proportionality was administered to UPNG preliminary year students. (This study is described in E.R.U. Report 6).

The reason for the choice of proportionality as an area for investigation was:

(i) its practical importance in many fields of study

(ii) the logical basis which has been proposed as underlying it. (Inhelder and Piaget, 1956).

The main results which stemmed from this study were, first, that students on the whole experienced a great deal of difficulty in handling proportionality, and second, that a generalized proportionality factor was a correlate of academic success at UPNG. This investigation also enabled some useful test-item modifications to be carried out.

This paper forms No. 10 in the studies prepared by the Education Research Unit.

(b) An English test, designed to investigate how far students were comprehending some very common words and constructions of a 'logical/quantitative" nature was administered to a wide range of students. A full description of this initial investigation is given in E.R.U. Report 4; overall, the results which were obtained indicated that there were serious difficulties which could be detrimental to students' comprehension of logical/quantitative expositions. On the basis of these results, a revised version of the test was produced.

(c) A series of short "logic" tests was administered to later year students at UPNG. The aim of this was simply to produce a series of test items, in a variety of contexts, which were as unambiguous as possible; a number of tests were developed out of this.

(d) A series of individual interviews in which subjects were asked to carry out tasks of a logical nature, in a concrete situation, was carried out with Form 2 and Form 4 students in a local high school. The conceptual difficulties which the subjects seemed to be experiencing were something of a revelation (to the author at least) and indicated that a substantial, in-depth investigation of this nature would be required.

On the basis of these studies, a considerably extended and more comprehensive investigation was planned for 1973. It was fairly obvious that two distinct components would be needed.

(a) A battery of "logic/quantitative" tests which could be administered to large groups of students.

(b) A series of interviews with a substantial sub-sample of the group included under (a), so that a more direct picture could be obtained.

This investigation has in fact been carried out, and while a full analysis of the results is not yet complete, enough interesting data has emerged to make an interim report worthwhile. A feature of the group testing programme was that, as much as possible, the subjects' teachers were involved. In each case, the tests were shown to the teachers beforehand for comment and discussion, and the testing programme was integrated into the regular routine as far as possible.

A further object of this report is to give a fairly complete description of the individual testing programme which was used. A number of requests for details of aspects of the programme have been received, and it is hoped that the description given will stimulate others to experiment themselves.

It is worth emphasizing that this is an interim report. Some of the results have not yet been received, and there are thousands of completed paper and pencil tests and hundreds of hours of individual testing to analyse. While this overview can indicate broad directions, it is likely that a fuller analysis will yield further information in terms of specific modifications, directions and alternatives which might be desirable.

THE TESTS AND THE SAMPLES

THE TESTS

Following the description of the item which is characteristic of the test, a brief rationable for the test is given. This has been kept as brief as possible: further enquiries will be welcomed, as will requests for copies of any of the tests, which are available from the author.

The Group Tests

1A. (i) Tall is to height as heavy is to _____?

(10 items)

(ii) If eight bicycles cost $ 440.00, how much would three bicycles cost?

[ ]

(3 items)

(iii) Three people stay at a hotel for a week, and the bill is $ 210.00. How much would it cost for eight people to stay at the same hotel for five days?

[ ]

(3 items)

(iv) Six is to nine as eight is to _____?

(8 items)

Ratio and proportion items which are heavily dependent upon English language; the numbers involved are quite simple.

1B. (i) A man spends R cents each on three bottles of beer, and P cents on a packet of cigarettes. How much will he now have left if he started with D dollars?

A. D - 3R - Pcents

B. 100 x (D-3R-P) cents

C. 100 D - 3R - P cents

D. $\frac{D - 3R - P}{100}$ cents

(4 items)

(ii) A man's car can travel Y miles on one gallon of petrol. If he drives for X miles, how much petrol will he use?

A. XY

B. $\frac{X}{Y}$

C. $\frac{Y}{X}$

D. (X + Y) (3 items)

The 1B (ii) items involve proportionality in the context of algebraic symbols rather than numbers; the 1B (i) items involve the same skill in "translating" from English to algebra, but do not involve proportionality.

1C. (i)

4	14
2	7
8	28
?	63

Missing number = ☐ (6 items)

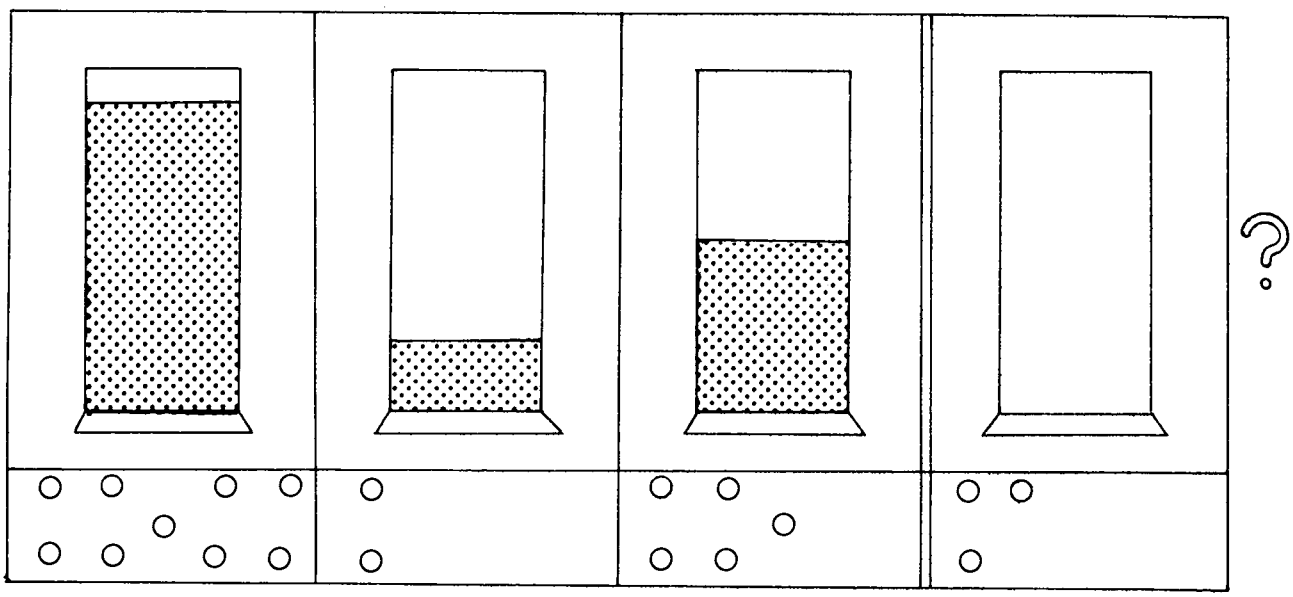
(ii)

9	16
3	10
15	22
?	11

Missing number = ☐ (8 items)

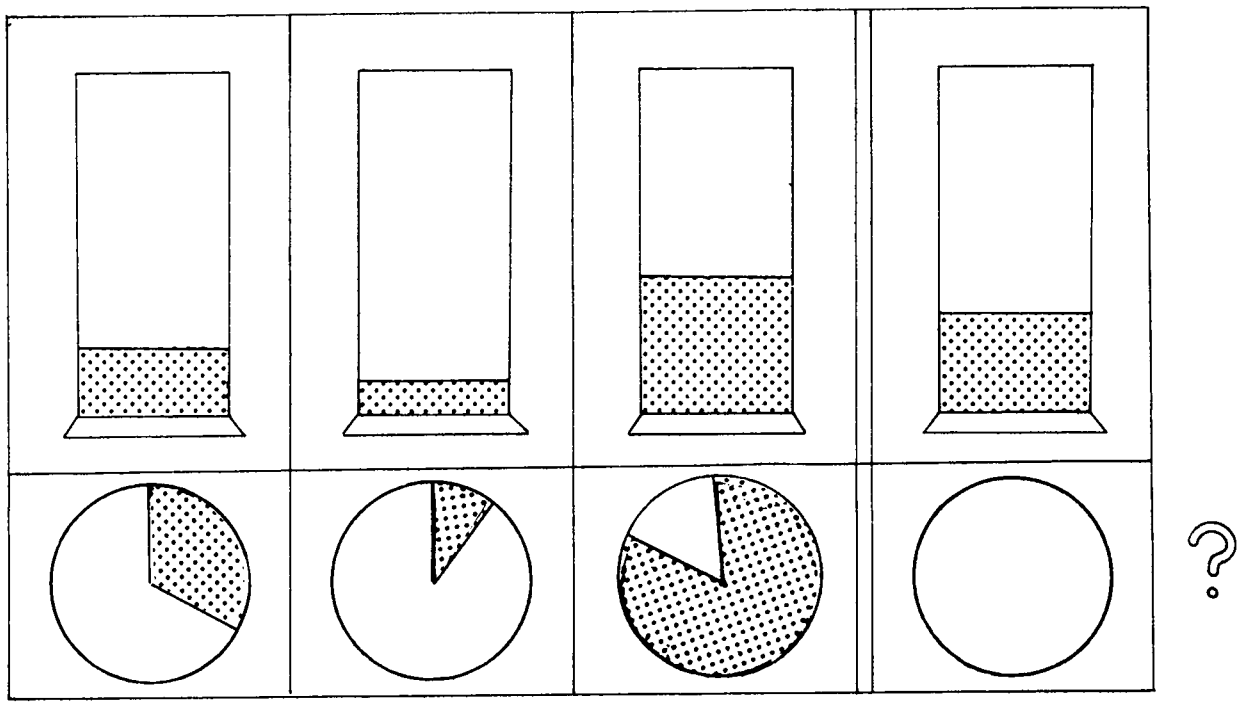
The 1C (i) items involve proportionality in a context which is practically independent of the English language, but is heavily dependent upon number. The 1C (ii) items are similarly dependent, but involve linear relations rather than proportionality.

1E.



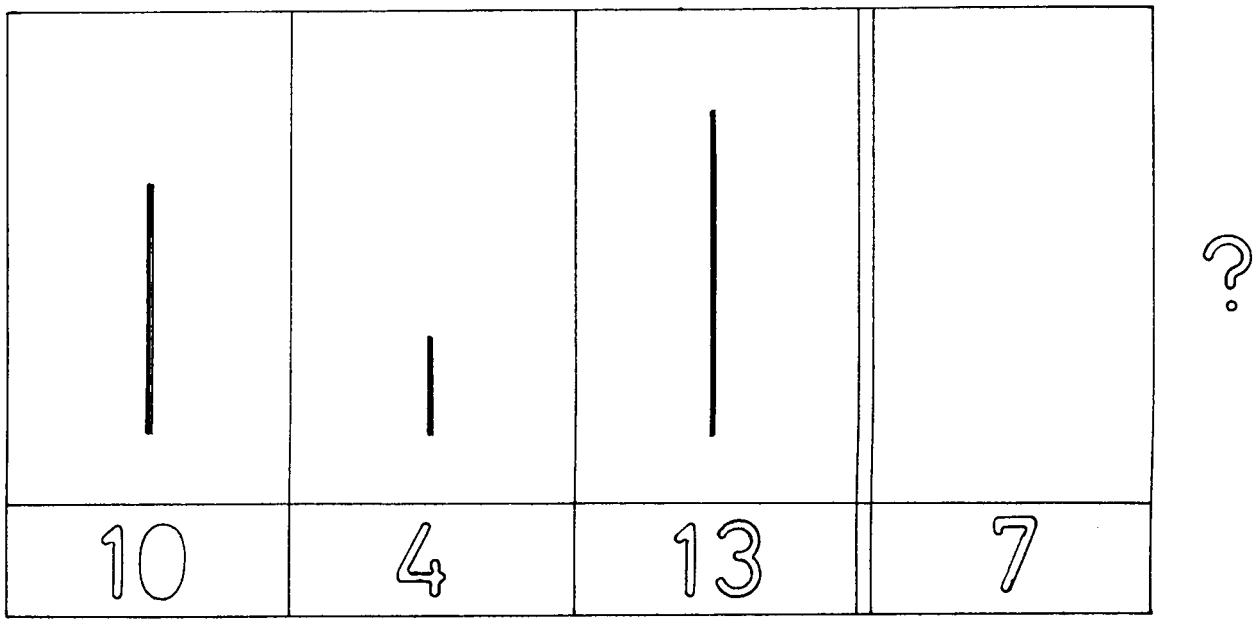
All of the items call for the recognition of proportionality between an analogue (shaded portion in the above example) and a number of dots. The ability to handle the items is practically independent of English and independent of number as an abstract entity. (All of the items involved direct proportionality). Subjects were instructed to answer quickly, drawing in freehand, and not to use measuring instruments.

1F.



The items require subjects to be able to handle proportionality between two "analogues" (shaded portions in the item shown); the ability to handle this is practically independent of English language and number. Two of the items involved inverse proportionality (i.e. one quantity gets smaller as the other gets larger: p x q = constant), and the instructions were as for 1E.

1G.



In this case the task is that of handling a proportionality between a number, as an abstract concept, and an analogue (length of line in the item shown). The items are practically independent of English language. One of the items involved a squared relationship, the others all involved direct proportionality. The instructions were as for 1E and 1F.

2A. "When a certain switch is pressed, sometimes a bell rings and sometimes it doesn't; when the switch is left alone, the bell doesn't ring."

If the bell rings, the switch has been pressed.

Yes No Can't say (5 items)

Subjects were required to circle the appropriate response according to whether the statement in the box was "definitely true", "definitely false" or "impossible to say".

These items (and those of 2B, 2C, 2D) are dependent upon the ability to draw valid conclusions from evidence which is presented. Basically it is that ability which is required, in the scientific method of enquiry, to judge whether or not data support a particular hypothesis. An ability to handle propositional logic - though not in the formal sense - is implicit in the ability to handle these items. All of the items involved two variables only. All of the items are heavily dependent upon English language.

2B. "There is a certain white liquid which turns yellow when certain chemicals are added to it. We take some chemicals labelled "A" and "B" and carry out some experiments".

Experiment

"A" and "B" are added - the liquid stays white

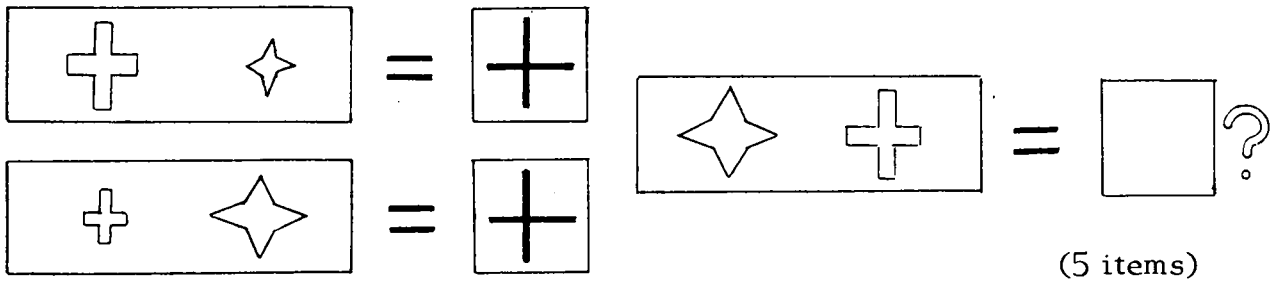
"A" is added on its own - the liquid stays white

If B was added on its own, the liquid would stay white

Yes No Impossible to say (6 items)

The abilities called for in answering the items are very similar to those required for 2A; the items in this test all had a definite "scientific" flavour while some of those in 2A did not. Three of the items involved three variables, the remainder involved four variables; they were therefore that much more complex than the items of 2A.

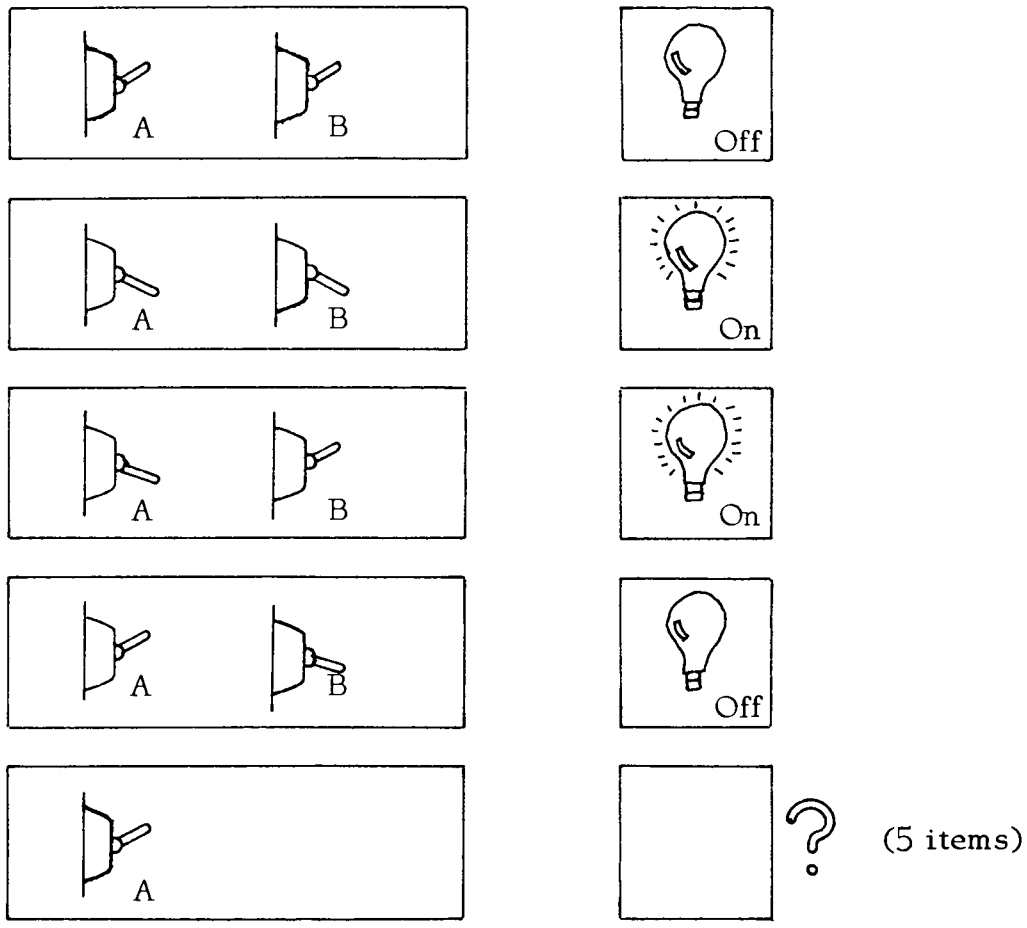
2C.



(5 items)

Subjects were instructed to draw in the correct figure if they were able to; if they considered that it was impossible to work out a specific answer, then they should write "Impossible" in the space. It was stressed that "Impossible" should be written only if it really were impossible for anyone to work it out. Again, the skills called for are similar to those of 2A and 2B (basically, an ability to handle propositional logic), but this time in a context which is very largely independent of English language.

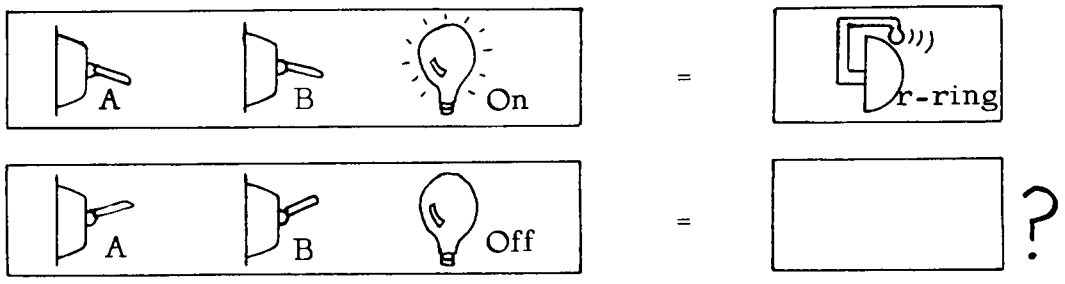
2D.



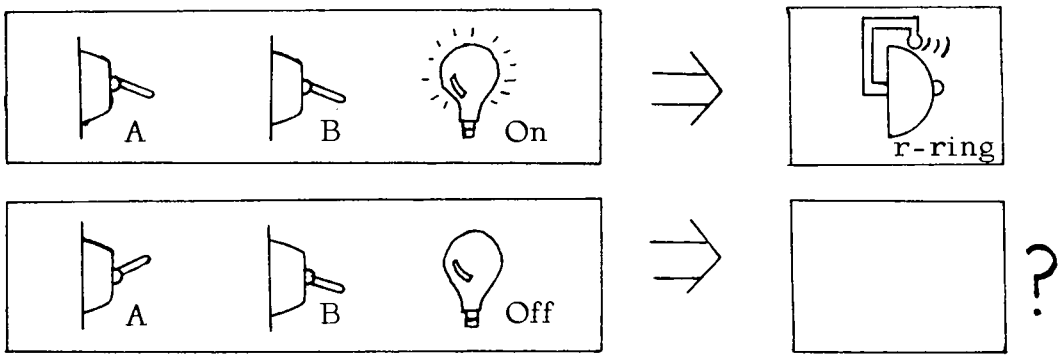
(5 items)

The instructions to subjects were exactly the same as those for 2C; also the "logic" skills involved were identical, apart from the fact that the problem has now been framed in a more practical context with which subjects are likely to be more familiar. It is, in fact, a language-free version of 2B in many respects.

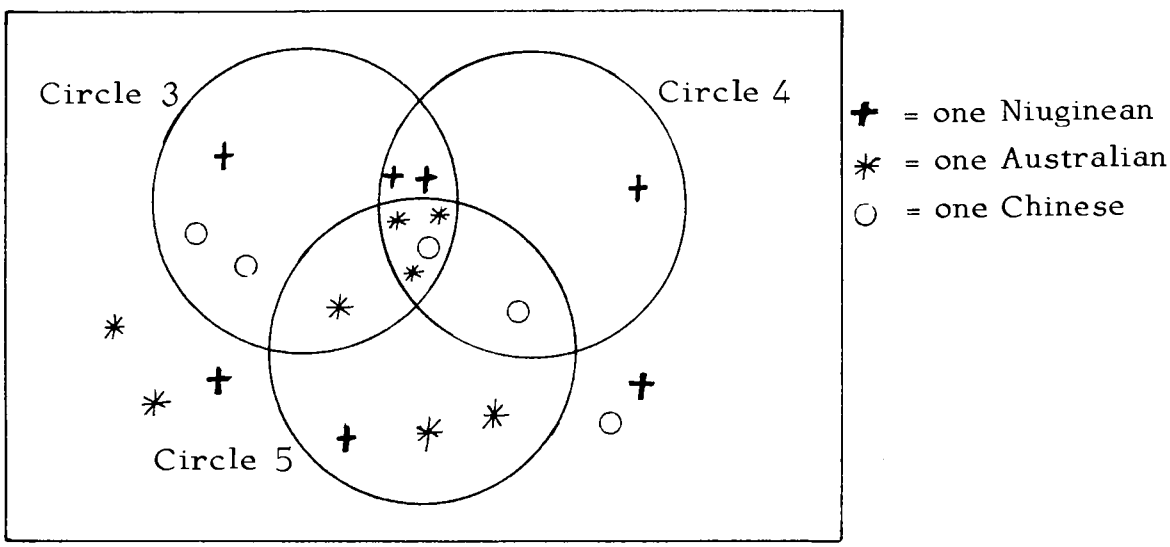
During some discussions which were held at Goroka Teachers' College, regarding the testing programme, there was a consensus of opinion that tests 2B, 2C, 2D were too difficult in that they "tricked" students into the wrong answers. For example, an item from 2D was as follows.



Now, a persuasive (but fallacious) logic is to insist that the bell will not ring in the second case, since everything has been changed; as a matter of fact it is impossible to predict the outcome in the second case. Accordingly, tests 2B, 2C, 2D were made "easier" by revising them so that there was no obvious pattern which directed students toward fallacious conclusions when conclusions were in fact impossible. In the revised 2D test, the above item became:



2E.



The diagram shows all the people who were inside a shop at a certain time.

People inside Circle 3 own cars

People inside Circle 4 are more than 40 years old

People inside Circle 5 smoke cigarettes.

1.	There are three Niugineans more than than 40 years old who own cars.	True / False	Uncertain
2.	Eleven people smoke pipes.	True / False	Uncertain
3.	There are seven Niugineans less than 40 years old who do not own a car and do not smake cigarettes.	True / False	Uncertain

(21 items in all).

In fact, the 21 items were divided over three separate diagrams (the one illustrated is the most complex), i.e. the test was in three parts with maximum scores of 5, 8, 8.

In effect, it is a classification task which is heavily dependent upon English language.

THE INDIVIDUAL TESTING SCHEDULE

All of the individual testing was carried out by the author, with one subject at a time present. The same order of presentation of the tests (except where indicated) was maintained for each subject, and the mode of presentation of the problem was the same for each subject. However, the exact form which the interview took was dictated by the subject's responses at each stage, and in this respect each of the situations was open-ended. This was the whole point of using an individual technique. All of the interviews were tape-recorded. The length of each interview varied considerably according to the subject; it ranged from about 45 minutes to about 2 hours.

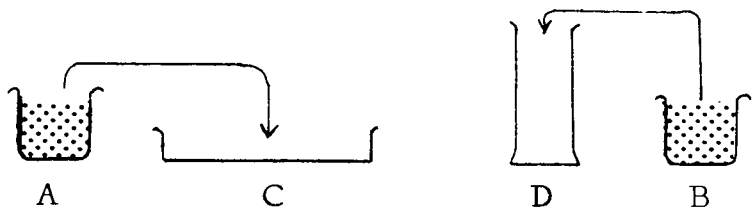
1. Conservation tasks

(a) Length

To determine whether subjects realized that length of a piece of wire remained constant when it was (i) linearly transposed (ii) rotated and (iii) bent.

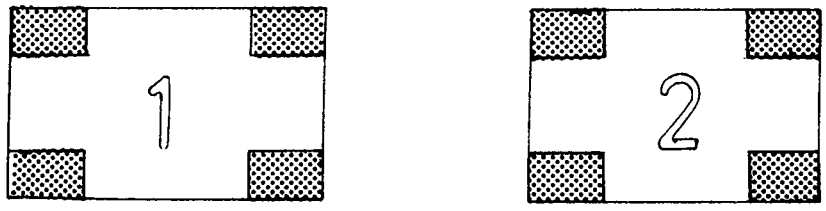
(b) Quantity

To determine whether subjects realized that the amounts of rice in beakers A and B (which the subject first agreed were identical) remained the same when they were transferred to C and D.



(c) Area

Subjects were first asked whether the areas left over (unshaded) were the same when four identical blocks (shaded) were placed on the corners of two pieces of board of the same size. (Actually, the board was presented as "a piece of ground" and the blocks as "houses"). All subjects agreed that the amounts left over were the same.



It was then determined whether subjects realized that the areas remaining were the same

(i) when the blocks of board 2 were arranged in a straight line down one edge; blocks on board 1 remained in the same place.

(ii) when the blocks of board 2 were arranged randomly over the board; blocks on board 1 remained the same.

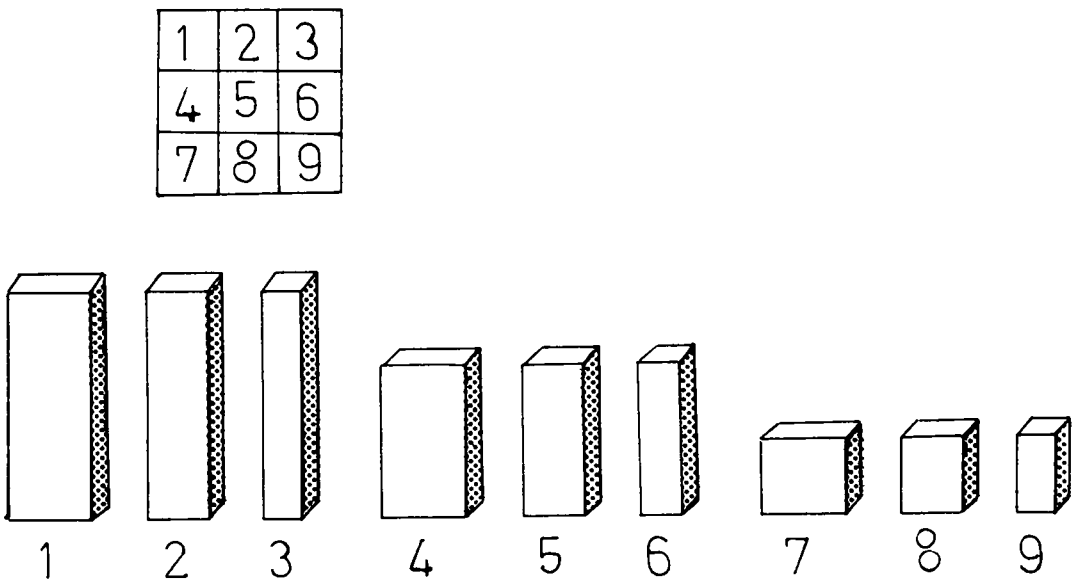
(d) Volume

Subjects were presented with two metal cylinders, one of aluminium and one of stainless steel, which were exactly the same size. They were allowed to handle these for some time, and then asked which was the heavier; the steel cyclinder was indicated in every case. The steel cylinder was lowered into a tall flask of water and the rise in water level marked. Subjects were then asked to predict where the level would rise to when the aluminium cylinder was immersed. (It will, of course, rise to exactly the same level.)

The ability to conserve physical quantities is obviously crucial for an understanding of practically the whole of the science programme in high schools and tertiary institutions. (Some of the primary science course also requires such an understanding.)

2. Bruner Matrix

This is described in detail by Bruner et. al. (1966; p. 156); the task is illustrated below.



Wooden blocks of different heights and thicknesses, as shown, were arranged in a 3 x 3 matrix as shown. The procedure was as follows.

(a) Subjects examine the matrix.

(b) Blocks 4, 5, 6 are removed and jumbled; the subject is asked to replace them.

(c) Block 1 is left on the board, all the other blocks are removed and jumbled; the subject is asked to replace the blocks.

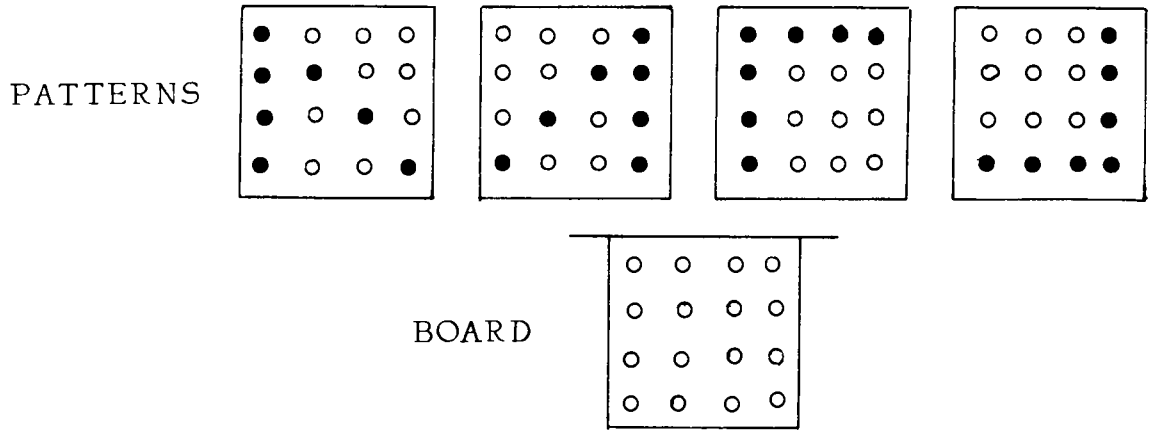
(d) All blocks apart from 1 are removed and jumbled; block 1 is then shifted to position 9, and subjects are asked to replace the blocks to make the same pattern that existed previously.

In order to cope successfully with the task, the subject needs to be able to classify on the basis of two attributes (height and thickness) and order the array accordingly. This "multiple ordering" is basic to a full comprehension of many situations involving relations between two or more variables.

3. Conceptual Strategies

(a) Button board

This is described in detail by Olson in Bruner et. al. (1966); the task principle is as follows.



The board can be programmed so that any desired button lights up (due to a bulb located underneath the clear plastic button) when it is pressed. Subjects are required to find out which of the displayed patterns has been programmed onto the board, by pressing as many buttons as they think necessary. In the example above (which is only intended to illustrate the principle - the actual patterns used were rather more complicated as they were displayed on a 5 x 5 matrix) it is only necessary to press two buttons.

For example, if we press the button in the top left corner, and it lights, then the pattern must be one of 1 or 3. Pressing any other single button in the top row then enables us to say straight away which of 1 and 3 it actually is (if the button lights, it's 3, if it doesn't it's 1).

Subjects were scored as to which of three broad strategies they adopted.

(i) Analytical - pressing a minimum (or slightly more) buttons.

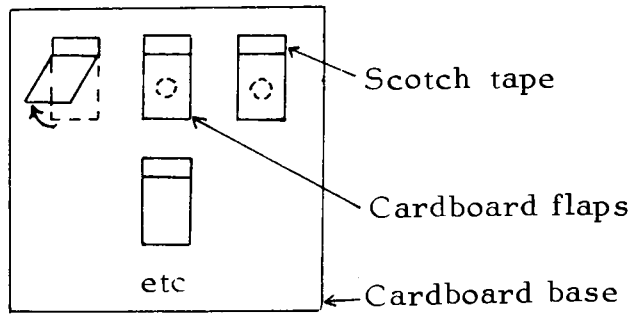
(ii) Partial pattern - where a whole section of a pattern is pressed out before a decision is made.

(iii) Pattern - where a total pattern (and sometimes every button on the board) is pressed before a decision is made.

(b) Flap Board

The task is precisely the same as described previously; this time though, instead of pressing buttons, the subject lifts cardboard flaps to confirm the presence - or not - of a coloured dot. This system has the advantage of cheapness and ease of construction.

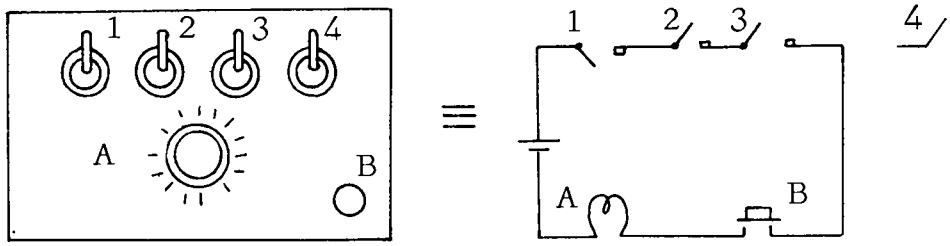
THE FLAP BOARD



Subjects' performance on the Flap and Button boards was correlated; the correlation coefficient was greater than 0.80, indicating that in effect the two pieces of apparatus measure the same thing.

The skills involved in solving this sort of problem analytically are the same as those required to carry out a qualitative analysis in chemistry, or to locate a member within a taxonomy. Basically it is a case of "asking the right question" to get the information which will give the maximum payoff.

4. Combinatorial Thinking



A box has 4 togle switches, a push-button, and a bulb as illustrated; the circuit is as shown. The subject's task is to make the bulb light up. He is also required to explain the functions of

(a) Switch 1 (which is a reversed switch)

(b) Switch 4 (which is not connected to the circuit and thus has no effect).

This situation is equivalent to a physical arrangement, where several variables have to be manipulated to produce a desired effect. Effectively it tests subjects' ability to recognize that various combinations of variables

exist, and that the effect of these various combinations has to be assessed in order to come to a full understanding of the situation. In addition, subjects have to carry out very simple experiments and draw valid conclusions from these, in order to ascertain the functions of switches 1 and 4.

5. The Balance (proportionality)

Subjects were required to bring a simple balance to an equilibrium position when different weights (in the form of metal washers) were suspended from the two arms. By free investigation with the balance they were required to explain "how the balance worked". The "rule" for the balance is: $W_1 \times L_1 = W_2 \times L_2$, where the W and L refer to the weight and its distance from the fulcrum, for each arm of the balance. This is an obvious proportionality situation, in that the ratio of the weights is the same as the ratio of the lengths. Subjects could "solve" the problem at one of two levels.

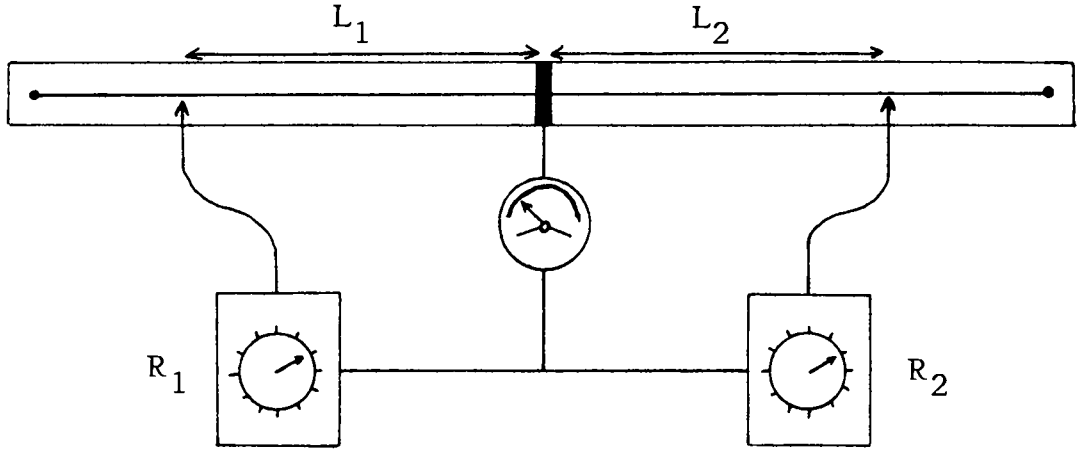
(a) qualitatively: big weight x short length = small weight x long length.

(b) quantitatively: where the numberical equivalence of the products was recognized.

This task was simply to assess the extent to which subjects were able to handle a proportionality relationship in a context with which they were familiar. (All of the subjects tested had "learned" the balance at school.)

6. The Wheatstone Bridge (proportionality)

This was simply a "black box" version of the balance task, set in a context with which subjects were not familiar.



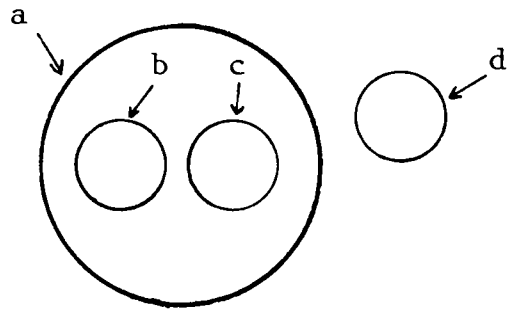
The subjects' task was to balance the arrangement (bring the needle on the meter to zero) by altering L_1, R_1, L_2 and R_2. the way in which these variables could be altered was demonstrated to the subjects before they started playing with the system. The balance position for the set-up occured when:

$$L_1 \times R_1 = L_2 \times R_2$$

and as such it is entirely analogous to the balance situation.

7. Classifications

This taks was complementary to that of 2E. In this case subjects were given several concepts and then required to construct the appropriate Venn diagram describing their relationship. (All subjects were tested for their knowledge of Venn diagram representations prior to this.) As an example, subjects were required to draw the diagram for: (a) things we eat, (b) meat, (c) kaukau, (d) tables. The correct answer is:



Subjects were asked to construct three such diagrams.

8. Logical Thinking in "Social" Contexts

The interviewer read out loud (and the subject followed on a printed sheet) a simple short story of about 300 words, which described a dispute between management and workers at a sawmill. Eventually this led to a strike. Subjects were then asked for their opinion regarding various aspects of the situation, and asked to justify their answers. Examples of this kind of question asked were: "Do you think the manager was fair to his workers?" "Was it sensible for the men to go on strike because of what had happened?"

The aim was to see the extent to which subjects were able to take an overall view of the situation and combine the various pieces of information available to them in arriving at a solution.

Hallam (1967) has described in detail a method for analysing responses in this kind of situation.

THE SAMPLES TESTED

(a) Group tests

1. About 150 UPNG preliminary year students. This was a random sample, tested during the first part of the first semester.*

2. About 100 Goroka Teachers' College first year students, taken randomly, and tested during the first half of the year.*

3. About 70 Goroka Teachers' College second and third year students (all of whom were studying mathematics) tested during the first half of the year.*

4. About 62 University of Technology first year students, taken randomly, and tested during the first half of the year.

*Not all subjects did all tests

5. About 61 form 4 students in an urban high school in Lae, tested during the middle of the year. This represented the whole of the 4th form.

6. About 60 form 4 and form 5 students in a large urban comprehensive school near Swansea in the U.K. tested at the beginning of the year. (This represents a fairly typical sample from a "semi-deprived" area in Britain.)*

7. About 300 form 5 and form 6 students in a senior high school, tested at the end of the year.*+

(b) Individual Testing

(i) About 16 UPNG preliminary year students, at the beginning of the year, some of whom have done the group tests, some of whom have not.

(ii) About 44 senior high school students, during the middle of the year. Eventually, they will all have completed all the group tests.

(iii) About 59 form 4 pupils in an urban high school, during the middle of the year, all of whom have completed the group tests.

RESULTS AND DISCUSSION

It has already been mentioned that a full analysis of the results has not yet been carried out; broad results only will be quoted, and discussion will tend to be in wide rather than specific terms. A detailed report will be prepared in due course, when a full analysis of the data has been completed.

THE GROUP TESTS

The mean scores on each of the items in the group tests for the different samples are shown in Table 1. Five features of the tests are noted in the table. These are:

1. Mean time for this group = 32 minutes

2. Mean time for this group = 25 minutes

3. Mean time for this group = 26 minutes (shorter times were allocated other groups - see below)

4. Revised tests consisting of four and not five items as with the other groups

5. The revised version of the E.R.U. English test, which has not been discussed in detail.

---

*Not all subjects did all tests; +Results not yet available.

TABLE 1: MEAN SCORES ON THE GROUP TESTS

Test	Means						
	A	B	C	D	E	F	
ERU Eng.	n.a	25.1[5]	19.3[5]	n.a	n.a	n.a	
1A (i)	9.09	7.16	6.38	7.31	6.96	7.24	
1A (ii)	2.92	2.15	1.36	1.93	2.59	2.69	1
1A (iii)	2.31	0.91	0.57	0.80	1.33	1.60	
1A (iv)	3.24	1.92	0.77	0.78	2.43	2.95	
1B (i)	1.72	0.95	0.62	0.64	1.06	1.02	2
1B (ii)	1.31	0.99	0.57	0.88	1.14	1.38	
1C (i)	3.14	1.22	0.84	1.14	1.78	2.05	3
1C (ii)	4.16	1.25	2.03	1.98	3.53	3.04	
1E	5.78	5.36	5.01	5.55	5.65	5.86	
1F	5.74	5.09	4.56	5.53	5.41	5.67	
1G	5.60	4.80	4.51	4.99	5.33	5.17	
2A	3.02	1.99	1.72	2.03	2.11	n.a	
2B	1.88	2.27	1.25	1.62	1.54	n.a	4R
2C	1.42	1.09	0.90	0.84	0.80	n.a	
2D	1.20	1.29	1.13	1.35	1.19	n.a	
2E (i)	n.a	4.57	3.85	4.14	4.49	n.a	
2E (ii)	n.a	6.66	5.77	5.73	6.80	n.a	
2E (iii)	n.a	6.30	4.77	5.47	6.39	n.a	
	(N=58)	(N=97)	(N=61)	(N=94)	(N=51)	(N=62)	

(Standard deviations have been omitted for the sake of simplicity)

A: British group; average age about 15 years

B: UPNG preliminary year; average age about 17-18 years

C: High School, form 4; average age about 16-17 years

D: Goroka, year 1; average age about 18 years

E: Goroka, years 2 and 3, average age about 19-20 years

F: University of Technology, year 1, average age about 17-18 years.

For the "logic" tests there is not much difference between the British and the indigenous groups, but when the proportionality items are taken into account, the groups may be classed (speaking relatively) as follows.

1. "High" performers - British group
2. "Middle" performers - UPNG, Goroka Teachers' College, University of Technology
3. "Low" performers - High school, Form 4, group.

Some brief comments on the results obtained for each of the items now follows.

ERU English. The UPNG preliminary year sample performed quite significantly better than the Form 4 group. Many quantitative and comparative terms gave a lot of difficulty, and in particular the conditional "if...then" construction was very badly understood.

Tests 1A. Overall, the British group performed much the best. The University of Technology sample performed next best, but for them the test was untimed: the average time taken by this group was 32 minutes (based on half the sample who filled in their time of completion), which is very much longer than the 12-15 minutes which was allowed for all the other groups.

On the whole, test 1A (i), dealing with relationships between concrete concepts, described through the English language, was handled much better than the questions which dealt with relationships between more "abstract" quantitative concepts, described through English language. It is also interesting to note how much more difficult the indigenous samples found 1A (iii) compared with 1A (ii). Checking back to the test item description will make it clear that the items are dependent upon the same kind of English and arithmetic skills. Conceptually however, the 1A (iii) items are more difficult in that an extra multiplicative relationship is involved; for example, in the illustrative item the concept of a "person-day" is needed to deal with the problem. This seems to make the items relatively much more difficult for the Papua New Guineans, as compared with the British schoolchildren.

1A (iv) was done badly by everyone; the extra time spent by Sample F seemed to give them a big advantage over the other indigenous group. This improved performance due to the extra time is not so straightforward as it might appear, since most of the other groups seemed to have attempted the majority of the questions, and their poor performance did not on the surface appear to arise out of their having insufficient time to complete the tests. However, it does appear as though a more relaxed and unhurried approach gave the group a distinct advantage.

One further point of note is the extent to which the year 2/3 Teachers' College subjects perform better than their year 1 counterparts. However, it must be remembered that the year 2/3 subjects were all studying mathematics as an option, and are thus a selected group.

Tests 1B. (translations" - English to equations) These items were not answered well by any of the groups. The inability of students in PNG to "translate" from one mode of communication to another (English to equations, equations to graphs, etc) has given rise to considerable concern; the results of this particular test tend to indicate that the concern is justified. An interesting point to note is that the proportionality items (1B (ii) - 3 items)

caused less difficulty than the other items (1B (i) - 4 items) which did not depend upon proportionality.

Tests 1C. (proportionality, abstract numbers) This test, which is dependent entirely upon the ability to recognize direct proportion and linear relationships in a "pure number" context, probably demonstrates the area in which the British sample enjoys the biggest advantage over the Papua New Guinenan group - particularly on 1C (i). During quite a large number of discussions with teachers of science and mathematics in PNG, the remark has frequently been made that "numbers cause Papua New Guinean students to switch off" - or something very similar. Certainly these results do nothing to refute this claim.

Again it is worth noting that the more "leisurely" approach of the University of Technology group gives them something of an advantage over the other Papua New Guinean samples. But taking a longer time does not necessarily lead to a better performance - there was no correlation between time taken and achievement, for subjects for whom the data was available.

Tests 1E, 1F, 1G. (proportionality, analogue situations) Apart from the fact that these items are framed in a more concrete, perceptual situation, the "proportionality" skill called for (i.e. an ability to see a constant relation between relations) is identical with that called for in test 1C (i). Yet the fact is that the Papua New Guinean groups perform very much better on these tests (as do the British subjects). So, to some extent it would appear to be the abstract concept of number itself which causes the difficulty. Whether this is the whole problem is another matter, since even on these tests, the British subjects perform rather better. However, the results which have been obtained certainly suggest that there is some merit in the suggestion which was tentatively put forward in ERU Report 6. That is, in teaching proportionality relationships (or any other functional relation), numbers should be introduced gradually after the relationships have been intuitively seen, in a qualitative sense through the use of physical analogues.

A few observations from around the market-place might also give a clue as to some of the difficulty experienced in dealing with direct proportion. Usually, "food value" and "price" do not bear a direct proportional relationship to one another; for example, at Waigani market a paw-paw costing 20¢ is only about 50% bigger than one costing 10¢; a paw-paw which is twice as big as a 10¢ paw-paw might well cost 30¢. The same sort of thing is usually true of mandarin oranges. And just recently I was assured, despite much expression of incredulity on my part, that the piece of sugar-cane of length about 6 feet was indeed 20¢, while the piece which must have been about $4\frac{1}{2}$ feet was only 10¢. (Both pieces were the same thickness). It seems as if in many cases an extra value "out of all proportion" is added to an article simply because it is bigger. There are plenty of examples of this in Western society too (gem-stones for example), but they tend not to crop up in every-day contexts.

Test 2A. (logical deduction, using English) This is a test of very simple logic, which is heavily dependent upon English; some of the test items closely parallel to those used in the English test. The British group performs the best.

Test 2B. (logical deduction, using English) In this case there is not nearly so much variation across the groups, and indeed, the UPNG preliminary year sample performs rather better than the British group. The kinds of

skills needed to deal with the items are just those which are needed to deduce valid conclusions from experimental data. On the whole it was answered poorly by all the groups; the main fault was that subjects jumped to conclusions which were not justified on the basis of the data which was available to them. There was very little difference in the performance on the original and revised versions of this test. The revised version did not suggest a "pattern" of results leading to a fallacious conclusion, as did some of the original test items. However, even when there was nothing in the way of a pattern of results, students still jumped to conclusions which were completely unjustified.

Tests 2C, 2D. (logical deduction, using diagrams) Much the same results as for 2B were obtained. Papua New Guinean students performed better on test 2D (the more readily-recongnized physical context) while the reverse was true for the British group. An interesting point to note is that the UPNG preliminary year group does much better on 2B than on either of 2C or 2D, despite the fact that 2B is heavily dependent upon English language, while the others are not; there is little in the "logic" test results as a whole to support any suggestion that English language difficulties play the major role in stifling achievement.

The kinds of skills tested by 2B, 2C, 2D (particularly 2B, 2D one could argue) are crucial for coping adequately with much of the science which is currently taught in secondary and tertiary institutions in PNG (and other parts of the world). The whole of the "guided discovery" method of teaching depends upon the ability of a student to draw valid conclusions from gathered data. If a student is not able to extract the valid result from a set of experimental data, then it becomes a case of accepting the validity of the result, on trust, from the teacher - in which case it would probably be less confusing in many cases for the teacher to simply tell his students the result in the first case. This is not an argument against the guided discovery method - it is an argument for a more careful consideration of the logical skills that students are expected to employ in specific situations.

The general lack of success of students in coping with these problems must be a cause for concern, and could well suggest that some re-directions in teaching programmes are required. It is cold comfort to point to the fact that the British sample couldn't cope with them either; they were, after all, a very young and rather undistinguished group, the great majority of whom will certainly not go on to tertiary studies.

Test 2E. (classification, Venn diagrams) The results which were obtained on this test were (to the author anyway) rather surprising. All the Papua New Guinean students coped with them rather well, despite the extent to which they depend upon rather complicated English language. This is a task which students are good at - it might well be possible to capitalize upon this in teaching programmes.

THE INDIVIDUAL TESTS

The results for the individual tests will be dealt with in sections, starting first with the conservation tasks. Table 2, below, gives the data for the three groups tested.

TABLE 2. SUCCESS IN DEALING WITH CONSERVATION TASKS

Task	A (N=16)	B (N=44)	C (N=59)
Conservation: length	56%	73%	64%
Conservation: quantity	88%	98%	95%
Conservation: area	81%	75%	51%
Conservation: volume	12%	36%	3%

Note: All parts of the test were required to be performed correctly, before it was counted as a "success".

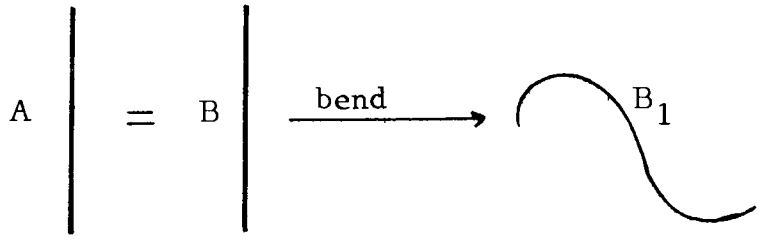
A: UPNG preliminary year students

B: Senior high school, Form 5 students

C: High school, Form 4 students.

At this stage, the following broad observations are possible.

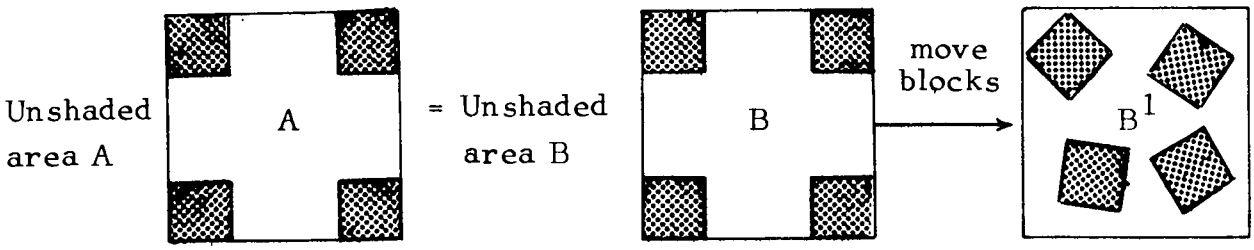
1. A significant minority of subjects tested were not conserving length in all situations. The context which caused most trouble was that where a straight piece of wire was subsequently bent - many subjects did not realize that the bent wire still retained the same length.



Many subjects predicted (after agreeing that A and B were the same length) that A was longer than B (or vice versa).

2. There is little difficulty in the conservation of continuous quantity.

3. Many subjects are not conserving area, particularly in the sample of Form 4 students. The situation which gave the most trouble was the following.



Many subjects predicted, after agreeing that the unshaded areas of A and B were equal, that:

Unshaded area A Unshaded area B[1]

and this would appear to be a perceptually dominated judgement; at first glance, the "ordered" area left over in A does appear rather more than the "randomized" area of B[1].

4. The great majority of subjects were unable to deal with this situation, most of them predicted that the lighter cylinder would cause the water to rise by a smaller amount, even though the two cylinders were exactly the same size. Nearly all of the subjects were unable to handle in an integrated way the concepts of weight, volume and density. This is a very disturbing result, particularly since all of the subjects could state that they had "done" density during science lessons, and professed to be familiar with the situation.

In the total sample there were very few subjects who were able to deal successfully with all of the conservation tasks. For at least one of the tasks the majority of subjects were unduly influenced by the "perceptual" characteristics of the situation.

TABLE 3. SUCCESS ON THE BRUNER MATRIX TASK

UPNG preliminary year	81%
Senior High School, Form 5	68%
High School, Form 4	59%

The high school sample performs most poorly, with the University sample coming out the best. Overall, it is surprising how much difficulty subjects experienced in dealing with this problem - an ordering according to two attributes does not, on the surface at least, appear to be unduly taxing.

TABLE 4. PROPORTIONS OF DIFFERENT STRATEGIES ADOPTED IN THE BUTTON-BOARD AND FLAP-BOARD TASKS

	Button			Flap		
	Pattern	Partial	Analytical	Pattern	Partial	Analytical
A	31%	31%	38%	38%	50%	12%
B	43%	25%	32%	36%	41%	23%
C	n.a	n.a	n.a	32%	64%	4%

A: University preliminary year

B: Senior High School, Form 5

C: High School, Form 4

The performance of the groups on the Flap-board was rather inferior to their performance on the Button-board. Overall, the results are not encouraging, with a majority of subjects opting for a perceptually-based rather than an analytically-based strategy. An ability to ask the right question at the right time is essential for the efficient solution of practically any problem; in this context at least, most subjects did not appear to possess the ability. (The basic skill needed to succeed in this task is very similar to that required to play "Twenty questions" - it would be well worth-while investigating how efficiently students are able to operate in an alternative context which does not lend itself so readily to perceptual biases.)

TABLE 5. PERFORMANCE ON THE COMBINATORIAL TASK

	1	2	3
UPNG preliminary year	12%	56%	32%
Senior High School, Form 5	45%	43%	12%
High School, Form 4	22%	42%	36%

1, 2 and 3 at the heads of the columns refer to a rough scoring procedure as follows.

1. Got the bulb to light, and explained correctly the functions of the "dud" and "reverse" switches (when asked).

2. Got the bulb to light, and explained correctly how one of the dud and reverse switches operated.

3. Either failed to get the bulb alight or could not explain the function of the dud or the reverse switch.

Table 5 indicates that the Senior High School group performed the best on this task. One of the main observations which arose out of this study was the extent to which subjects were unable to draw valid conclusions from experimental data. (In many respects the task of determining the function of the two switches was a real-life version of tests 2B, 2C, 2D.) A depressingly common example of fallacious reasoning was the following, in the position where the three switches (neglecting the dud) were in the position for making the bulb light up.

(a) Dud "off", press the button - Light comes on.

(b) Dud "on", press the button - Light comes on.

Conclusion: "This switch (the dud) is the main switch".

On questioning subjects further, the reasoning seemed to be something like "The light comes on no matter what we do to this switch, it must be a very "powerful" switch - probably the one which controls all the others". This means that the whole idea of an experimental control was lost on students who responded in this way; the results lend weight to the remarks which were made earlier regarding guided discovery.

TABLE 6. PROPORTIONALITY: THE BALANCE AND THE WHEATSTONE BRIDGE

	Balance			Bridge		
	1	2	3	1	2	3
UPNG preliminary year	19%	37%	44%	50%	44%	6%
Senior High School, Form 5	14%	43%	43%	35%	43%	2%
High School, Form 4	37%	47%	16%	n.a	n.a	n.a

1, 2 and 3 at the heads of the columns refer to a rough scoring procedure as follows.

1. Got the individual operations for balancing only, but didn't combine them in any way, or get the idea of qualitative proportion.

2. Got the concept of qualitative proportion.

3. Got the concept of quantitative (or metric) proportion.

Only a minority of subjects, particularly in the Form 4 group, were able to demonstrate that they understood the "rule" for the balance, in quantitative terms; and this was despite the fact that all of the subjects reported that they had "learned the balance in science". The proportion of subjects who were able to transfer their knowledge of the balance to an analogous, unfamiliar situation was very small, as the results for the Wheatstone bridge indicate. In many cases, students were able to trot out some plausible-sounding jargon, only to later display their total lack of comprehension of the physical situation. As an example, a number of subjects who talked about "clockwise and anti-clockwise moments" failed completely in their attempts to find an equilibrium position for the balance when there were different weights on the two arms. (One such girl spent some time in trying to find a balance position by moving both weights along the same arm!.)

Overall, the results which were obtained in this context tend to indicate that the difficulties which students experience with proportionality are (in part, at least) "real" conceptual problems and are not entirely due to English language or number problems. But this is not to say that such problems are unimportant, particularly in non-practical situations. A basic problem seems to be that rote-learning measures, or "survival tactics" as

Johnson (1972) has so aptly named them, have been largely substituted for any kind of real comprehension. This is no new observation, but the extent of the trend is rather disturbing.

THE CLASSIFICATION TASKS

In general, students found these problems much more difficult than those of 2E, in the group situation. That is, they seemed to find it much easier to operate within a ready-made classification system than they did to construct their own classification systems on the basis of prescribed attributes of familiar concepts. This is perhaps not surprising.

Again, in this context, there was a lot of evidence for "learning without understanding". All of the subjects tested were very familiar with Venn diagram representation, through their work in mathematics. Subjects' answers to questions, their explanatory comments, etc. were liberally sprinkled with the jargon of set theory; "universal set", "union", "intersection" - and yet in many cases these were being applied in a totally wrong fashion to the concepts and their attributes which were under discussion.

One point which was very striking was the extreme difficulty that many students had in generating examples of things which would be found in certain areas of the diagrams (i.e. in generating concepts characterized by specific attributes). For example "A living thing which does not walk on two legs" and "A human being who does not speak English or pidgin" both proved to be too much for quite a large number of subjects; they just could not think of any examples. It could well be that a more "divergent" approach to the study of classifications and the like would be beneficial.

THE INTERVIEW IN A "SOCIAL" CONTEXT

So far, only the roughtest subjective assessment has been carried out. All that can be said is that students varied a good deal in their ability to gather together the various strands and come to a reasoned opinion. Some adopted a very comprehensive overall view of the situation, others "fixed" on one aspect, making all judgements in terms of this, and neglecting other facts which were available to them.

SOME CONCLUDING REMARKS

There are a number of assumptions associated with any instructional programme or teaching strategy. For example, in starting off on a piece of work, one invariably has to make some assumptions about a student's grasp of concepts and particular skills and abilities. If these assumptions are incorrect, then right from the start there is little hope of the objectives of the programme being achieved. A number of the results from this study indicate that there are quite probably areas where unjustified assumptions are being made about what students are capable of. Take the task involving the conservation of density: most tertiary students are unable to cope with this, although they have covered the topic of density (in some detail in most cases) at high school. A similar result is obtained with the balance situation.

However, it is possibly in the area of students' logical skills that some of the most serious wrong assumptions may be made; particularly in the area of science. At the most basic level, science is concerned with two things:

(a) Concepts, which are used to talk "effectively" about the kinds of natural phenomena with which the discipline is concerned; things like mass, energy, force, etc. are concepts which are basic to the study of physical science.

(b) Relations between concepts - usually in the forms of generalizations or "laws". (Newton's second law, for example, describes a generalized relationship between the concepts of mass, force and acceleration for an object.)

The "scientific method" is simply an approach which is aimed at the determination of some specific general relationship between concepts, and ultimately this is the kind of skill which science (and other disciplines too) aims to teach. However, in order to draw valid conclusions from the results of experiments a form of propositional logic is involved; and it has already been pointed out that if students do not have an implicit grasp of the required logical operations, then many of the objectives of the programme are being subverted. It is almost certainly true to say that, judging by the results of this study, the majority of secondary and early tertiary students in PNG do not have the requisite logical skills. (Neither did most of the subjects in the British sample, judging by the results of the paper and pencil tests.)

Part of the problem could be due to the fact that teaching programmes frequently seem to attempt to teach concepts through procedures which are also concerned with the establishment of relations between concepts. This can be very confusing to students. Take the following example:

> We have two liquids in two separate beakers marked A and B, and we test each of the liquids with some grokle, which is a white solid. We know the following facts:
>
> when grokle is tipped into a clag it turns black
> when it is tipped into a kluk it stays white.
>
> The two liquids in the beakers are tested with the grokle, and it is found that the liquid in A has no effect on the grokle, while grokle tipped into B turns black.
>
> Some trypkithilum (shiny looking stuff) us then dropped into each of the beakers, marked A and B. The tryplithilum dropped into B has no effect, while that dropped into A causes the liquid to froth up, and eventually the trypkithilum disappears.
>
> Question: what do you deduce from this?
>
> Answer: plastics disolve in kluks, but not in clags. (Did we forget to mention that trypithilum was a plastic? Sorry!).

This is not all that easy to follow. But, replace clag and kluk by acid and base respectively, grokle by litmus paper and trypkithilum by magnesium say, and we have exactly the situation which young students are confronted with in science lessons. Why is the real-life situation so much easier to handle for science teachers? Precisely because we are very familiar with the concepts of acid, base, litmus as an indicator, etc. and we know what is going to happen all the way along the line; we also know what the result of the

experiment/deduction process is going to be. However, for a student who is meeting this situation for the first time the whole thing is very confusing; he doesn't know what the result is going to be - he is expected to deduce it from the sequence of operations. And framing the deductive exercise in a context which abounds with strange-sounding names only complicates the siutation unduly - clag, kluk and trypkithilum are likely to be almost as meaningful to the reader as acid, base and magnesium (as concepts) are for the average secondary science student in PNG.

Really, this kind of teaching procedure attempts to get over three separate things. (a) an understanding (through familiarization) of the basic concepts involved (grokle, acid, clag, litmus, etc.); (b) a piece of knowledge concering a relationship between these concepts; and (c) a familiarization with a procedure (experimentation-deduction) through which "pieces of knowledge" may be obtained. There is an argument to be made that it is impossible to do all three concurrently. Instead, what should possibly be happening is the following.

1. Students should learn new concepts and become thoroughly familiar with these simply by being presented with positive and negative examples of the concept.

2. Students should learn inductive and deductive logic, in simple situations, in terms of concepts with which they are already familiar.

Only after 1 and 2 have been achieved should a progression be made to situations where "pieces of knowledge" concerning the concepts are deduced as a result of experimentation. The basis of the argument is that it is not feasible to do three jobs at once.

Another point to be remembered is that if a teacher's assumptions about a student's conceptual development or logical ability are too high, then right from the start there is going to be a communication gap between student and teacher; and as the programme progresses, a compounding of confusion will almost certainly result, with accompanying frustration for both teacher and student.

In an attempt to improve students' abilities to deduce valid results from given information, a pilot project, funded by the Department of Education is being mounted in a number of high schools during 1974. A range of materials, largely in the form of board games which students can play against one another, is being developed. To succeed in these games, certain logical skills are required; the hope is that by playing the games the desired skills will improve. Whether such abilities will in fact develop, and whether they can then be meaningfully transferred to real-life situations, remains to be seen.

One encouraging piece of evidence has been reported by Chidzey, working with students at Lae Technical College (private communication). The items of tests 1E, 1F, 1G were used as an introduction to the concept of ratio and proportion. Students were taken through the analogue:analogue, analogue:number of dots, analogue:"abstract number" representation, in sequence, and only after these had been mastered was the problem tackled in an "abstract number":"abstract number" context. Although not a game, in the strict sense of the word, this situation is in fact similar to an approach which is being tried through one game where the object is to collect sets of different representations of the same ratio, (expressed as areas, numbers, slices of pie diagrams etc.)

One of the broad findings of the study has been that students in general perform a good deal better (given essentially the same task) in some contexts than others. This is a potentially fruitful area for further investigation. It is as important to build upon students' strengths as it is to take steps to remedy weaknesses. A further point which has been noted is that individual students, in many cases, seem to have a preference for a particular context. The idea that students are individuals is nothing new - but even so the process of individualizing instruction by giving students a choice of material to follow in order to reach the same end-point has been much neglected. (An obvious - and to some extent valid - reason for this is the amount of extra work involved in programme preparation.) A project which is being planned for 1974 will investigate the extent to which students have "preferred modes" of information intake (written work, pictorial, oral, etc.) and further consider the feasibility of presenting material in alternative forms, so that students may utilize the form they find most comprehensible.

REFERENCES

Bruner, J. S.; Olver, R. R. and Greenfield, P. M. — Studies in Cognitive Growth. London: Wiley, 1966

Hallam, R. N. — "Logical thinking in History". Educational Review, 19, 183-202, 1967.

Inhelder, B. and Piaget, J. — The growth of logical thinking. Routledge and Kegan Paul: London, 1958.

Johnson, R. K. — "A report on language problems of tertiary level students using English as a second language in Papua New Guinea". TMMC Research Report 19; UPNG; 1972.

Jones, J. — "Comprehension of some commonly-used words: A study with tertiary students in Papua New Guinea". ERU Report 4, UPNG, 1972.

Jones, J. — "Proportionality a predictor of success at the University of Papua New Guinea". ERU Report 6, 1973.

GEOGRAPHY ACHIEVEMENT LEVEL AND THE COGNITIVE STYLES OF NIGERIAN PUPILS

Dr. P.O. Okunrotifa, Department of Education,
University of Ibadan, Nigeria.

One hundred and sixty high and low geography achievers, selected by stratified random sampling from Forms 2, 4 and Lower 6 (Grades 8, 10 and 12) of a male and a female high school in Nigeria participated in this study. All the subjects were given a cognitive preference test. The results showed a significant relationship between geography achievement level and cognitive styles for boys but not for girls. Male high geography achievers differ significantly from male low geography achievers in their cognitive styles. The paper highlights the educational implications of these findings for curriculum development in geography.

Cognitive style is concerned primarily with the manner in which an individual perceives and analyses a complex stimulus configuration. Kagan and Moss(1) defined cognitive style as "a term that refers to stable individual preferences in mode of perceptual organisation and conceptual categorisation of the external environment". They then suggested that among individuals of adequate intelligence, there are splitters, those who "characteristically analyse and differentiate the stimulus field applying labels to sub-elements of the whole", and lumpers, those who "tend to categorise a relatively undifferentiated stimulus". Hence, they postulated that three cognitive styles are recognizable in adults and children. These are: analytic-descriptive, inferential-categorical and relational.

Analytic-descriptive style: In this type of cognitive style, a subject differentiates and selects elements of similarity shared by two or more stimuli. The criterion for classifying is a particular characteristic that can be found in each of the stimuli grouped together e.g. grouping two pictures together because "both have six buttons each". The most common analytic concept to the watch-man-ruler item is "the watch and ruler have numbers". This concept is called analytic because the numbers differentiate components of the total stimulus.

Inferential-Categorical style: A subject demonstrating this style groups together, on the basis of some inference about the stimuli, without overtly differentiating the elements within each stimulus. The criterion for classifying is a super-ordinate concept and each whole stimulus is an independent exemplar of that concept e.g. grouping two pictures together because "they are living things".

---

(1) Jerome Kagan and H.A. Moss, "Psychological significance of Styles of Conceptualization". In: J.E. Wright and J. Kagan (Eds.) Basic Cognitive Processes in Children, Monograph of the Society for Research in Child Development, 28, 2, 73-112, 1963.

Relational style: In the demonstration of this style, a subject groups stimuli together because of the functional relationship between the grouped stimuli. None of the grouped stimuli is an independent exemplar of the criterion used for classifying. On the contrary, the concept (criterion) is only meaningful when the grouped stimuli are considered together. Often, the criterion tells some sort of story about the relationship between the grouped stimuli e.g. grouping two pictures together in the watch-man-ruler items because "the man can wear the wrist-watch" or in the chimney-match-pipe item because "the match is used to light the pipe".

Kagan and Moss claimed that the relational style pays the least attention to details of the stimulus array before categorizing while the analytic-descriptive style pays the most attention to details of the stimulus array. The analytic-descriptive style was therefore ranked highest while the relational style was ranked lowest in terms of cognitive functioning. But Gardner(2) argued that the inferential-categorical style is equally as analytic as the analytic-descriptive style and in addition "represents a considerable higher level of abstraction". A critical appraisal makes Gardner's contention seem more tenable and would lead to a re-ranking of the styles with the inferential-categorical style ranking first and the analytic-descriptive style second in cognitive hierarchy. This could suggest that high achievers in geography might exhibit more of the inferential-categorical style in their categorization of stimuli.

METHODOLOGY

The present investigation was designed to test the validity of the suggestion. There were two hypotheses tested:

1. Among high and low geography achievers, there would be no significant difference in the distribution of cognitive styles they exhibit when presented with categorization tasks.

2. There would be no significant difference between instances of inferential-categorical style shown by high and low geography achievers.

SUBJECTS

One hundred and sixty subjects participated in the present study. They were selected by stratified random sampling in Forms 2, 4 and (Lower) 6 (Grades 8, 10 and 12) of a male and a female school, Government College, Ibadan and Queen's School, Ibadan in Nigeria. The subjects consisted of equal numbers of high and low geography achievers as defined by their ranking in the first and fourth quarterlies respectively in their most recent school examination in geography.

---

(2) R.W. Gardner, "Discussions on Psychological Significance of Styles of Conceptualization". In: J.E. Wright and J. Kagan (Eds.) Basic Cognitive Processes in Children, 28, 2, 112f, 1963.

EXPERIMENTAL MATERIALS

The experimental material for the investigation was the cognitive preference inventory developed and refined by Kagan and Moss. The inventory consisted of nineteen pages of pictorial drawings. Each page contained a set of three drawings of common objects such as animals and plants.

ADMINISTRATION OF EXPERIMENTAL MATERIAL

The inventory was administered to all subjects in each school at a group sitting. The instruction to each subject was standardized on the cover of each inventory booklet. The subject was asked to select two out of the three pictures on a page that were alike in some way and to state the reasons for his grouping as briefly as possible. Subjects were told that there was no wrong or right answer. Each subject worked at his own pace.

SCORING

Each of the nineteen items of the experimental material was scored and tallied according to the cognitive style reflected in each subject's response. The tallying was across all subjects under each achievement level. Any response that could not be placed unequivocally under one of the three styles was omitted. The score in each style was the total number of tallies under that style. The same trained scorer scored all the responses, thus avoiding inter-scorer inconsistencies.

RESULTS

Tables 1-5 summarize the results. Tables 1 and 2 indicate that, among the boys, high geography achievers differ significantly in cognitive styles from low geography achievers. The data for the girls as shown in Tables 3 and 4,

Table 1

Distribution of Cognitive Style Scores for Boys

Class	Geography Achievement Level	Analytic-Descriptive	Inferential-Categorical	Relational
Form 2	High	133	120	30
	Low	139	100	46
Form 4	High	129	122	33
	Low	138	97	50
Form 6	High	100	70	19
	Low	133	41	16

Table 2

Chi-Square Analysis: Cognitive Styles for Boys

Class	No. of Subjects	X^2	d.f	p
Form 2	30	5.32	2	$< .10$
Form 4	30	6.64	2	$< .05$
Form 6	20	12.52	2	$< .01$
Across Classes	80	17.57	2	$< .001$

did not indicate a consistent distinction in cognitive styles between high and low geography achievers. Therefore, the first null hypothesis for this study is rejected for boys and supported for the girls.

Table 3

Distribution of Cognitive Style Scores for Girls

Class	Geography Achievement Level	Analytic-Descriptive	Inferential-Categorical	Relational
Form 2	High	213	37	32
	Low	252	12	16
Form 4	High	120	122	70
	Low	100	97	41
Form 6	High	135	33	14
	Low	150	26	8

Table 4

Chi-Square Analysis: Cognitive Styles for Girls

Class	No. of Subjects	X^2	d.f	p
Form 2	30	21.34	2	$< .001$
Form 4	30	2.79	2	ns
Form 6	20	3.26	2	ns
Across Classes	80	21.86	2	$< .001$

Tables 1 and 5 also show that male high geography achievers were more inferential-categorical and less analytic-descriptive than male low geography achievers. This difference between the male high and low

Table 5

Chi-Square Analysis of Inferential-Categorical Style Scores

Sex	No. of Subjects	X^2	d.f	p
Boys	80	5.99	2	$< .05$
Girls	80	1.96	2	ns

geography achievers on the inferential-categorical and analytic-descriptive was highest at the sixth form (twelfth grade) and lowest in the second form (eighth grade). The male high and low geography achievers did not differ on a consistent basis as regards the educational style.

FINDINGS

The findings of the present investigation indicate that there is a significant relationship between geography achievement level and cognitive styles for boys but not for girls. Furthermore, the male high geography achievers were found to differ significantly from the male low geography achievers in their cognitive styles.

The inferential-categorical style involves more than analytic description of details or relating of two or more ideas. It involves the arrangement of assumptions, premises, and conclusions in a way to develop logical deductions. It would seem therefore from the results of the present study that the male low geography achievers tended to operate at the lower levels of cognition while the male high geography achievers tended to operate more at the higher levels of cognition. This finding did not seem to hold for female high and low geography achievers. A possible reason for this might be that the two sexes adopted differing approaches to intellectual tasks. Indeed, Davis(3) has already shown that males and females adopt different strategies or operations in functioning intellectually.

It would appear from this study that cognitive styles are an important aspect of intellectual functioning and they do influence how the child learns and what kinds of strengths and weaknesses he will display. Children with differing styles will learn different things with individual facility. It is therefore not sufficient to know how bright a child is, one must also know what kind of cognitive dimensions his intelligence operates in.

IMPLICATIONS FOR GEOGRAPHY TEACHING

Studies like the one reported here appear to have implications for curriculum improvement in geography. The term, 'curriculum' is being used here in a more comprehensive sense - all the learning experiences provided the students under the auspices of the school.

---

(3) J.K. Davis, Concept Identification as a Function of Cognitive Style, Complexity, and Training Procedures. Wisconsin Research and Development Center for Cognitive Learning, University of Wisconsin, Madison, 1967.

New geography courses which are currently being instituted in high schools are stressing the understanding of principles, concepts, and processes rather than rote knowledge of bodies of facts. In higher grades of high schools, for instance, the testing in the field of theories that explain and predict the spatial patterns of various characteristics of the earth's surface is being encouraged. It would seem from this study that the success of an individual learner in such new approaches to geography could well be a function of his cognitive style or his ability to analyse complex stimulus configurations (geographic materials). An assessment of the cognitive styles of students by geography teachers could therefore be valuable. For instance, for geography teachers to promote the new understanding and skills demanded in geography it might be valuable, as a point of departure, to diagnose the range of potential cognitive styles of learners. The diagnosis would certainly involve knowing not merely the test scores or the intelligent quotients of geography students but also to a great deal about their 'style of intelligence', what cognitive operations cause pupils difficulty and also which ones they operate facilely. The teachers' knowledge of such antecedent conditions of geography students could enable them to provide a variety of learning experiences capable of fostering geographic understanding and skills.

An assessment of the cognitive styles of students by geography teachers has implications for curriculum provisions in the classroom. On the basis of students' cognitive styles, programmed instruction materials in geography could be used as enrichment materials with students who want to learn more about specific topics. Furthermore, the geography teacher could make use of such assessment to differentiate instruction. Thus, pupils do not merely engage in group activities but the activity is differentiated, as possible, so that the student's unique learning potential is considered.

The assessment of the cognitive styles of students by teachers could go a long way in increasing teachers concern about the continued development of students' intellectual abilities. What kind of thinking do the students engage in? How resourceful are they? Can they direct their own goals and initiate their own learning? Are they learning to give thoughtful explanations of things they see, hear, and do? Do they consider their ideas important? Do they relate similar experiences together to draw conclusions? Teachers can use these questions as a guide in helping students develop their potentialities.

If the existing cognitive structure of the student is suitably organised, it facilitates the learning of new subject matter. If it is disorganised it inhibits learning. Hence it is largely by strengthening relevant aspects of cognitive structure that new learning can be facilitated. And when we deliberately attempt to influence cognitive structure so as to maximise meaningful learning, we come to the heart of the educative process.

A STUDY ON THE SALARY STRUCTURE OF AND INCENTIVES FOR THE AGRICULTURAL GRADUATES OF BANGLADESH

Dr. Mohammed Selim, The Institute of Education and Research, University of Dacca.

The study team comprised Dr. Mohammed Selim, Dr. Mazharul Haque, Dr. Mohammed Azher Ali, Dr. B. Wazihur Rahman, Dr. Mohammed Obaidur Rahman, Dr. Mohammed Hafizuddin Shaikh, Dr. Abu Obaidul Haque.

Agriculture in Bangladesh still remains at the subsistence level with illiterate farmers engaged in agriculture who are not familiar with the modern techniques of farming. It is, therefore, essential that agricultural graduates are attracted to this sector so that maximum utilization of land and human resources can be made to bring about optimum production in agriculture.

The present study was undertaken in order to investigate into the causes of lack of efficiency, if any, from the human resources engaged in agriculture, i.e. the trained and highly skilled manpower engaged in agriculture. This study was the first attempt and hence a pioneer one in identifying the salary structure and other conditions of service of agriculture graduates in Bangladesh.

Objectives of the Study

The following were the stated objectives of the study on the salary structure and incentives for the Agricultural graduates of Bangladesh:

1. To identify and determine the salary structure of the Agricultural graduates of Bangladesh.

2. To identify the material and psychological incentives for the agricultural graduates in order to measure their job satisfaction.

3. To find out the extent of unemployment and underemployment of agricultural graduates and its possible reasons.

4. To determine the degree of optimum utilization of the agricultural graduates' knowledge, training and skills.

5. To find out the salary differentials of agricultural graduates employed in the public and private sectors.

6. To review the trends in the employment pattern of agricultural graduates during the last 21 years since 1947.

7. To recommend specific measures to ensure efficient and maximum utilization of qualified and trained personnel in Agriculture.

Methods and Procedures of the Study

Four different studies within the framework of a unified plan were designed and conducted in order to find answers to the relevant questions raised. These were:

(ε) a survey of documents concerning the status of agriculture graduates in Bangladesh;

(b) a survey of agricultural graduates of the then East Pakistan for the period 1947-1968 who were employed in agriculture or were without employment;

(c) a survey of agricultural experts and/or employers of agricultural graduates in the then East Pakistan; and

(d) a survey of organizations/offices in Bangladesh concerned with agriculture.

A review of related materials in agriculture was undertaken in order to provide a logical background for the present study. The materials reviewed included documents concerning agricultural activities in the then Pakistan. The documents comprised mostly of research and other relevant publications.

For the survey of agricultural graduates factual information was collected from the records maintained by the Agricultural University, Institute of Agriculture, and the University of Dacca; records and membership list of Agricultural Graduates' Association of the then East Pakistan and records of agricultural graduates maintained by the offices/organizations in the then East Pakistan. In addition, a questionnaire prepared for the agricultural graduates was sent to the 940 graduates by mail. A questionnaire for specialists and employers of agricultural graduates was administered at personal interviews by the researchers to a sample of eleven in this category.

The survey of major organizations and offices concerned with various aspects of agricultural development or activities in the then East Pakistan was conducted in order to obtain data regarding salary scales, benefits given, future plans, etc. The data gathering instrument used for this purpose was a Schedule. This instrument was administered through personal interview to the heads of the eleven offices/organizations to which the specialists/experts also belonged.

Major Findings of the Study

The data collected through the data gathering instruments already briefly described, resulted in the following findings about the salary and incentives for the agricultural graduates:

1. Fifty-two per cent of the graduates held degrees in agriculture, and forty-eight per cent of the graduates held degrees in veterinary medicine.

2. In respect of universities of graduation of the agricultural graduates, one observable trend was that the higher the level of education the more was the number of graduates produced by foreign universities. All the doctorates in agriculture were obtained from foreign universities. This

might be due to the fact that there is very little opportunity in Bangladesh for respondents to pursue any doctoral programmes in agriculture.

3. It was found that the period of unemployment, on the average for all categories of agricultural graduates was three months. The trend was that the higher the respondents academic qualification the less was the likelihood of their remaining unemployed. No category of respondents remained unemployed for more than four months. This indicates that there is a great demand for agricultural graduates.

4. In respect of job experience, it was found that a majority of the respondents had less than five years experience in agricultural work. The data also revealed that the more experienced employees had to suffer less in respect of unemployment.

5. The data revealed that the salary of the group appeared to be less than Tk. 400 per month (in 1968-69). The data also revealed that in the higher salary ranges the number of employees was very few, while the bulk of the employees were in the lower salary brackets. A high positive correlation was found between the salary drawn and the period of service. Compared to government and semi-government agencies the scope of promotion for agricultural graduates in private service was very limited. The prospect of promotion for agricultural graduate employees was the brightest in teaching and most dismal in supervision.

6. The prospect of getting confirmation in service was most dismal under the government and relatively much better in either semi-government or private service. The prospect of permanent job status, which is a factor of job security for all employees, was connected with higher educational qualifications.

7. Regarding salary and benefits, a higher percentage of agricultural graduates with lower educational qualifications than those with higher educational qualifications felt that they were getting less salary and other benefits. Salaries in government employment were less than the private and semi-government employment.

8. In respect of job security, agricultural graduates with doctorate degrees and a minority of others felt that they had job security. A marginal majority of the government employees, a very small minority of the semi-government employees and none of the private employees felt that they had job security.

9. Regarding satisfaction with service conditions, it was found that on the average, agricultural graduate employees are dissatisfied with their present salary. Employees with doctorate degrees appeared to be more satisfied with their salary than the Masters and Bachelor degree holders. Private employees were more satisfied than the semi-government employees and the latter were more satisfied than the government employees with their present salary.

10. Benefits other than salary, service conditions related to present position, housing accommodation or house allowance, medical facilities, and facilities available for education of children were considered unsatisfactory by agricultural graduates. In general, though, the extent of satisfaction varied with the educational qualification of the employees.

The higher the qualification the more satisfied was the employee.

11. Adequate provision for incentives to agricultural graduate employees has been made by the employing agencies.

12. Specialists/employers rejected the statement that the prevailing agricultural education in the country was producing graduates aspiring more for high ranking offices than for the actual improvement of agriculture.

AGRICULTURAL EXTENSION WORK AMONG RURAL WOMEN IN SELECTED DEVELOPING COUNTRIES

Jancis E. Smithells
School of Education, University of Birmingham

AIMS AND METHODOLOGY

The main aim was to study the agricultural extension work at present being done among rural women in certain developing countries, with a view to assessing the likely demand for staff training courses in Britain.

Two overseas visits were arranged in 1968/69, one to Africa, in which visits were made to Uganda, Kenya and Western Nigeria, and the other to the Caribbean Islands of Trinidad, St. Vincent, Puerto Rico and Jamaica. While attention was focussed particularly on the provision of the agricultural extension services for women, the itinerary included contact with other relevant government organisations. The second aim was to assess the adequacy of the provision of courses in Britain, in the light of the identified needs. This study, which took place in 1969/70, was supplemented by a review of similar provision in the Netherlands, Denmark and Eire, and of the appropriate international agency, F.A.O.

ORGANISATION OF EXTENSION WORK AMONG RURAL WOMEN

Informal education programmes for rural women were undertaken by a number of different agencies within each country. For example, ministries concerned with agricultural extension, community development, and health were involved, as well as various voluntary organisations. These agencies tended to work somewhat independently and to train their own staff. Ministries concerned with agriculture were, on the whole, the more recent of the ministries to organise programmes for women, and to train women staff to run them.

At the time of the study, there were programmes for women in the agricultural extension services of Uganda, Kenya, Western Nigeria, Puerto Rico and Jamaica; consideration was being given to the development of such programmes in the agricultural extension services of the other two countries visited, namely Trinidad and St. Vincent.

The initiative for the development of programmes for women in agricultural extension appeared to be related to one or more of the following factors:-

(i) the influence of the US model of co-ordinated extension, directed to farmers, rural women, and rural youth.

(ii) public pressure for the admission of girls to agricultural colleges, and an increase in the number qualified to do so.

(iii) the spontaneous interest shown by rural women in training facilities offered by agricultural extension services.

(iv) the recognition by male agricultural staff of the need to involve rural women in the rural development process.

The subject matter considered appropriate for agricultural extension work among women included aspects of home economics and agriculture, for example, nutrition, home management, poultry keeping, and growing food crops.

Training for women staff in home economics/agriculture and extension work was more developed at the intermediate level than at the universities. Most intermediate level agricultural training institutions were administered by the ministries concerned with agriculture in these countries, and those open to women usually offered a course which was primarily in agriculture, but with some home economics.

There was at least one intermediate level institution open to women in Uganda, Kenya, Western Nigeria, Jamaica and Trinidad; in Kenya consideration was being given to opening other institutions to women. At the university level, degrees in Home Economics were offered in Kenya and Puerto Rico, but this was taught separately from agriculture. There were Faculties of Agriculture in the University of East Africa, in Western Nigeria, and the Universities of the West Indies and Puerto Rico.

Senior women employed within the agricultural extension services had received their training variously in the indigenous agricultural colleges, at teacher training colleges, or overseas. As a result of these different sources of staff, and types of training, women staff employed in extension services were qualified in home economics, in agriculture, or in a combination of both. The ratio of men to women staff varied very much from country to country. The figures available for 1967/68 showed the number of women employed in extension services, as home economists, agriculturalists, or a combination of both, to be 7 in Uganda, 172 in Kenya, 32 in Western Nigeria, 1 in Trinidad, none in St. Vincent, 121 in Puerto Rico, 1 in Jamaica plus 2 part-time.

NATURE AND SCOPE OF THE WORK

Most of the extension work with rural women was conducted on a group basis through short residential courses, or through the organisation of women's clubs. The service was primarily directed to women farmers, and farmers' wives, but in some cases also included girls in such organisations as 4-H and Young Farmers' Societies. Home economics in the context of agriculture was becoming less oriented to the teaching of specific skills, such as needlework and cookery, and more oriented to tackling the problems of the family in a comprehensive way, for example, in terms of home management, child care, and nutrition education.

Consideration was being given to means of co-ordinating the work of various agencies concerned with rural informal education programmes. The

focus of these efforts was changing from programmes dealing with narrowly defined problems, to integrated programmes to tackle common problems; for example, programmes on nutrition education allowed a number of agencies to be involved.

FUTURE DEMAND AND EXTENT OF NEED

The establishment of extension services for women, and the appropriate staff training, had relied heavily on overseas training facilities, and overseas personnel acting as trainers and advisers. It was clearly desirable that indigenous training should be developed, and that national staff should replace expatriates as soon as possible.

Intermediate level training for women to work in agricultural extension was developed rapidly, but there were very limited facilities for advanced training and research. The development of these extension services, and training facilities, was creating a need for experienced women, suitably qualified, to play a key role in the planning and administration of programmes, in staff training at the intermediate and university level, and in research.

The limited opportunities for advanced training in the countries concerned, the need sometimes for rapid promotion of field staff, or the transfer of women from other fields of work such as teaching, meant that women appointed to senior posts were often in need of supplementary training. This was where the greatest need for training arose, and where the countries concerned were least able to meet the demand. In some cases, the need was for further qualifications and in others for additional experience, and this required periods of time away from the job of from a few months to several years. The training need was sometimes related to subject matter, for example in nutrition or horticulture, and in other cases to the work role, for example in extension methods or staff management.

The size of the demand within any one country was likely to be limited to a few individuals at any one time, and called for programmes of training, at home or overseas, designed on an individual basis to meet the needs of a particular person in relation to a particular job. The most acute need was expected to arise in response to a specific development in the extension service, or in a training institution; developments in the service were especially likely in Trinidad, St. Vincent and Jamaica, where programmes were just beginning. The need for staff trainers was widespread.

In regard to training overseas, where a large part of the supplementary training described was likely to be conducted for some time, several factors appeared likely to contribute to its success. These included communication between the student's employing organisation and the training institution overseas, flexibility in planning the student's programme, and the provision of counselling and guidance for the student during her stay abroad.

It was considered that, in the long term, this process of training senior staff would make possible the establishment of the full range of appropriate training institutions in the countries themselves, including university level home economics with agriculture, and professional training for extension work.

In summary, the development of extension services for rural women appeared to call for training for women which would enable them to build the new training and service institutions required, involving both the creation of a new professional group, and the establishment of appropriate staff training.

ASSESSMENT OF TRAINING FACILITIES IN BRITAIN AND SELECTED EUROPEAN COUNTRIES

In making this assessment, the sponsorship, selection, placement, training, resettlement and subsequent employment of students on their return home, were regarded as forming an integrated and continuous process.

When reviewing the sponsorship system of the British, Netherlands and Danish Governments and of F.A.O., it was clear that the particular needs of individual overseas students were given close attention, so that the most appropriate formal or informal training facilities could be found. However, rather limited emphasis appeared to have been given in Britain to the particular needs of women in agricultural extension services.

There were, in Britain, general courses open to overseas students in agriculture and home economics. There were also special courses in these subjects, related to development and to aspects of professional roles having some similarity to extension work. These were at both university and non-university levels. However, there was no special provision for women with responsibilities in the dual areas of home economics and agriculture.

A relatively small number of women students, coming from developing countries and destined for agricultural extension work, had come to Britain in the years preceding this study. Up tc that time, they had been dispersed among a number of training institutions throughout Britain. There was, however, some concentration of training effort in Britain for certain other professional groups related to extension work overseas, for example community development workers and teachers. The agricultural component of these courses was a relatively small one, but a few women from the extension field had been admitted to them. This form of concentration was therefore making some contribution to meeting the training needs with which the study was concerned.

However, in regard to agriculture there was a very limited degree of concentration of training effort to meet the needs of overseas students in Britain. There were a few courses at post-graduate level in agriculture related to the tropics, and one on agricultural extension per se. There appeared to be no such provision for overseas students in Britain at the non-university agricultural training institutions.

In addition to this relative lack of concentration of effort in training appropriate for the women in question, there was a negligible degree of communication and collaboration between home economics and agricultural training institutions admitting women students in this field. There was virtually no direct communication between the overseas organisations employing the students and the institutions in which they received training in Britain, except in the few cases where trainers had visited the country themselves. Overseas experience of any kind among the staff of British training institutions admitting overseas students was notably limited, even

in the case of some of the special courses designed for them. This was less marked at the university level, than in non-university institutions. In comparable situations in Denmark and the Netherlands, there appeared to be greater opportunities for visits overseas.

Considerable flexibility was built into the British courses specially designed for overseas students. But for those attending general courses, especially at non-university level, the pressures of the set curriculum provided little opportunity for additional or alternative studies and activities which might make some aspects of the work more applicable to the student's home situation.

The staff of certain home economics training institutions reported that the admission of individual overseas students to general courses was unsatisfactory, and believed that organising a special course for these students was much to be preferred. This would allow for much more individual programme planning and opportunities for guidance and counselling.

A major problem in developing valid training courses appeared to be the lack of an appropriate extension service for rural women in Britain, which might be used in the course of training for visits of observation and periods of attachment. There is however a very suitable model, geared to the needs of a primarily agricultural country, in the Agricultural Advisory Service in Eire. This service also has a training institution with the major function of providing women extension staff, either as Poultry Advisers or as Farm Home Management Advisers. Not only might this Service provide very valuable opportunities for observation, to supplement the facilities in Britain, but there was also evidence that applications from overseas women for formal training or a year's attachment, would be favourably considered.

The situation revealed by the study can be summarised as follows. It appeared that, if the needs of women training in Britain for work in extension services were to be adequately met, special programmes or courses would be required. These should ideally provide for training in the subject of agriculture and home economics and a range of selected aspects of professional training, according tc individual needs.

CONCLUSION

While the development of extension services for farmers' wives had not yet received very high priority in the National Development Plans of the Third World countries visited in the study, there was little doubt of the serious intentions of the ministries of agriculture concerned to develop such services, as funds allowed. These programmes required women staff with skills embracing the many aspects of the woman's role in the farming communities as well as others equipped to hold senior positions as staff trainers and supervisors, and as policy makers.

Only through the combined efforts of a range of training resources in Britain, supplemented by visits to neighbouring countries with appropriate extension services, could women appointed to senior positions in this field gain the additional experience and training lacking in their own country. It was necessary that, in making plans for the future, account should be taken of the basic need to establish institutions in the countries themselves, and of the increasing role played by training institutions in non-Western countries,

both inside and beyond those visited during this study. It seemed that perhaps the most useful contribution from Britain would be to make known the resources relevant to this particular field, to develop centres of excellence concerned with these training activities, and to increase the opportunities for the men and women concerned with teaching overseas students to travel overseas and become more familiar with extension services, training institutions, and conditions in developing countries.

THE NATURE, DIRECTION, AND EXTENT OF THE DROP-OUT PROBLEM IN THE NIGERIAN FRENCH LANGUAGE CLASS

Dr. P.A.I. Obanya, Research Fellow, Institute of Education,
University of Ibadan

The first serious attempt to teach French in Nigeria was made soon after independence in the early sixties. French teaching had to start from the universities and advanced teacher training colleges in those days (as a pilot project) in order to produce a large corps of qualified teachers for secondary institutions. This was intended to help solve West Africa's peculiar "language problem" which Markward (1967) had lamented. (1) Soon after the launching of the pilot scheme French became a popular subject in Nigerian secondary schools, gradually replacing Latin. In those days it was customary to see advertisements like "Entrance examination to ABC High School, FRENCH and SCIENCE taught", and a school which taught French and Science was considered a good school.

But it now appears that French is gradually losing its attraction and popularity. A large number of schools has stopped the teaching of French because "teachers were not available" or because "our students are not interested in the subject". Henri Evans, one of the pioneers of the teaching of French in this country, has even lamented "the wholesale abandonment of the subject after class III". (2) French language teaching in Nigerian Secondary schools is therefore facing a very grave crisis.

My interest in the drop-out problem began in 1971-72 and has continued to date. The discussion below represents the answers I have been able to obtain from my inquiries into the problem during the past three academic years.

THE LAGOS SURVEY (1971-72)

The purpose of this was to find out "une vue d'ensemble" of the French language teaching situation in the secondary schools of Lagos city. The findings of the survey have been published elsewhere. (3) The most striking feature of these, however, is the rate of drop-out. As can be seen from Table I the enrolment in twenty French classes in the third form was 682 (an average of 34 a class). This fell to 209 (an average of 10 a class) in the fourth form and fell further still to 134 (an average of 7 a class) in the fifth form. Table II shows the drop-out rate in percentages. A striking feature here is the tendency for the drop-out rate to be higher among boys than it is among girls. This finding of course confirms studies carried out in other contexts and environments. (4) If eighty per cent of those who began the study of French in the first form in Lagos drop-out by the time they get to the fifth form the situation in the interior or the country must be really serious. This was the consideration that led to a further probing of the drop-out phenomenon outside Lagos.

Table I

French Enrolment in Forms III-V
(From 20 Lagos City Secondary Schools)

Year	Class	Boys	Girls	Total	Average class enrolment
1970	Form III	377	305	682	34
1971	Form IV	94	115	209	10
1972	Form V	47	87	134	7

Table II

Drop-Out Rate in Percentages

Year	% Drop-out		
	Boys	Girls	Whole Group
1970-71	74	61	69
1971-72	50	24	31
1970-71-72	87	73	80

THE IBADAN STUDY (1972-73)

This aimed at determining the popularity of French as a secondary school subject. Nine schools in and around Ibadan were chosen for this study which involved 1,117 pupils (606 boys and 511 girls). These pupils were given a subject-preference questionnaire on which were printed sixteen most commonly taught secondary school subjects to be arranged in order of preference. Six of the schools were situated in the city of Ibadan and three in the rural areas around Ibadan. The main criterion for the selection of schools was the availability of teachers of French as a previous study has shown the teacher supply problem to be a determining factor of the success of the French teaching enterprise. (5)

As can be seen from Table III French tends to diminish in importance as one goes up the secondary school ladder. From fifth position in the first form it jumps down to tenth position in the fifth form.

Rural children gave significantly lower ratings to French than did urban children. The Ibadan study showed, like the Lagos one, that sex is an important factor in the French language drop-out problem. Table IV, for example, shows the numbers and percentages of fifth and fourth forms boys and girls in the Ibadan sample who were still studying French at the time of the study. Thirty-two per cent of the whole group were still studying French, but almost half of the girls (47%) were in this group while the figure for the boys was around one-fifth (21%).

Table III

Trend in the Position of French among 16 School Subjects

Class	No. of pupils involved	Average Rank assigned to French
I	232	5
II	257	7
III	230	8
IV	222	9
V	176	10

THE ILORIN STUDY (1973-74)

This was a longitudinal study of secondary school students preference for, and attitude to, the study of French. Two hundred and eight first formers (166 boys and 114 girls) were used for the study. They were all from the three government-owned secondary schools in Ilorin. One of these was a mixed school, the second a boys' school, and the third a girls' school. Government owned secondary schools were selected for the study because they are most likely to maintain an uninterrupted flow of qualified teachers of French.

Table IV

Voluntary choice of French in Forms IV and V

Sex	+French	-French	Total
Boys	46 (21%)	177 (79%)	223
Girls	75 (47%)	85 (53%)	160
Total	121 (32%)	262 (68%)	383

The pupils concerned had to complete a subject-preference Questionnaire (as was the case with the Ibadan study) as well as a French Attitude Scale (FAS). This procedure is to continue for three years - up till the time French ceases to be a compulsory subject. Tables V and VI represent progress reports on this study, as at the end of the first year (May 1974).

Table V shows that French is a high priority for over 35% of them and low priority for the remaining 8%. The chances are, then, that over 50% of these students are likely to continue with the study of French in the senior classes. One wonders however, whether this is likely to be the case.

An analysis of Ilorin students' responses to the French Attitude Scale is given in Table VI. It is interesting that even at this early level of their educational career, students are not too keen on studying French for its own sake (see their responses to items 1 and 4). Their response to item 12,

which also stresses the intrinsic value of French is different. These children seem fascinated by the sounds of French. It is equally interesting that they are already thinking of the utilitarian values of French. They seem to agree that they will need French in adult life (items 3,6,), that a knowledge of French could mean a well paid job (item 7). They recognize the need for international communication (item 8) and need to enrich oneself linguistically by adding French to the number of languages already known (item 11). The children seem to feel that French is a difficult subject (item 5) and that it could also be intellectually challenging (item 2). A large number of the students are not satisfied with the type of teaching they are getting (item 14). Parents and friends of pupils are far from exercising negative influences on pupils, as far as encouragement to study French is concerned (items 13,15,16).

Table V

Summary of 1st-Year Preference for French

Order of Preference	Girls		Boys		Whole Group	
	N	%	N	%	N	%
1	7	6.86	11	7.14	18	7.03
2	11	10.78	15	9.74	26	10.16
3	9	8.82	20	12.99	29	11.33
4	15	14.71	23	14.94	38	14.84
5	15	14.71	18	11.69	33	12.89
High Priority	57	55.08	87	56.50	144	56.25
6	10	9.80	14	9.09	24	9.38
7	9	8.82	10	6.49	19	7.42
8	12	11.76	15	9.74	27	10.55
9	3	2.94	6	3.90	9	3.52
10	5	4.90	7	4.55	12	4.69
Medium Priority	39	38.24	52	33.77	91	35.55
11	2	1.96	4	2.60	6	2.34
12	-	-	-	-	-	-
13	1	0.98	2	1.30	3	1.17
14	1	0.98	2	1.30	3	1.17
15	1	0.98	3	1.95	4	1.56
16	1	0.98	4	2.60	5	1.96
Low Priority	6	5.88	15	9.74	21	8.20

Table VI

Analysis of FAS (French Attitude Scale) Questionnaire

(N + 280)

Statement	Very true	True	No opinion	Untrue	Very far from the truth
1. For his education to be complete every child will need to learn French.	17 (6.07)	27 (9.64)	38 (13.57)	51 (18.21)	147 (52.50)
2. French is meant for those who cannot cope with other school subjects.	3 (1.07)	22 (7.85)	38 (13.57)	52 (18.57)	165 (58.92)
3. In adult life one will certainly not need French.	10 (3.57)	43 (15.35)	70 (25.00)	51 (18.21)	106 (37.85)
4. The sounds of French are marvellous and so one should learn to speak the language.	29 (10.35)	76 (27.14)	49 (17.50)	61 (21.78)	65 (23.71)
5. French is too difficult a language for the average Nigerian child.	32 (11.42)	89 (31.78)	41 (14.64)	46 (16.42)	72 (25.71)
6. A Nigerian does not normally come in contact with speakers of French. So he does not need the language.	10 (3.57)	20 (7.14)	56 (20.00)	47 (16.78)	147 (52.50)
7. A knowledge of French will earn one a well paid job.	40 (14.28)	66 (23.57)	68 (24.28)	56 (20.00)	50 (17.85)
8. We all need to know French because our country is surrounded by French-speaking countries.	55 (19.64)	55 (19.64)	43 (15.35)	41 (14.64)	86 (30.71)
9. I do not feel I need French but my teacher makes me like it.	51 (18.21)	97 (34.64)	29 (10.35)	24 (8.57)	79 (28.21)
10. A knowledge of French means that one will be able to communicate with a large number of people.	37 (13.21)	57 (20.35)	68 (24.28)	44 (15.71)	74 (26.42)
11. One does not need to be able to read and write French because one already knows English and a Nigerian language.	10 (3.57)	30 (10.71)	28 (10.00)	40 (14.28)	172 (61.42)
12. It will be simply satisfying to be able to read and write French.	66 (23.57)	120 (42.85)	28 (10.00)	28 (10.00)	38 (13.57)

Statement	Very true	True	No opinion	Untrue	Very far from the truth
13. My friends will laugh at me if I stick too much to French.	22 (7.85)	37 (13.21)	37 (13.21)	31 (11.07)	153 (54.64)
14. I would have taken my French seriously if I had a good teacher.	86 (30.71)	98 (35.00)	23 (8.21)	16 (5.71)	57 (20.35)
15. All my friends will admire me if I can speak French fluently.	84 (30.00)	96 (34.28)	49 (17.50)	22 (7.85)	29 (10.35)
16. If I take French seriously I shall be disobeying the wish of my parent.	1 (0.35)	7 (2.50)	13 (4.64)	18 (6.42)	241 (86.07)

N.B. The figures in brackets are percentages.

CONCLUSIONS

This summary of research findings to date shows that a problem already exists. French is becoming increasingly unpopular. The enrolment figures for French language study are not encouraging. It is also the fifth best (on the average) for the Ibadan group. Teachers have a tendency to dismiss the looming danger of wholesale abandonment of French by saying "students are not interested in the language". The reason for the problem appears more deep-rooted, as can be seen from Table. VI. Solutions are therefore urgently called for.

REFERENCES

1. Makward, E: "The Language Problem". West African Journal of Education, (June 1963), pp 87-93.

2. Evans, H.G.J: "Does Everybody Need French?". Le Francais au Nigeria, (September 1972), pp 18-28.

3. Obanya, P.A.I: "L'Enseignement du Francais dans les ecoles secondaires de Lagos", Culture Francaise (Automne 1974), pp 16-27.

4. Bartley, D.E: "The Importance of the Attitude Factor in Language Drop-out", A Preliminary Investigation of Group and Sex Differences, Foreign Language Annals, pp 31-33, 1970.

5. Obanya, P.A.I: "Getting Teachers for French in Nigerian Schools", Teacher Education in New Countries, (November 1971), pp 175-182.

EDUCATION IN FIJI

A STUDY OF POLICY, PROBLEMS AND PROGRESS IN PRIMARY AND SECONDARY EDUCATION 1939 - 1973

Dr. C. Whitehead
Education Department, University of Otago
Dunedin. New Zealand

During the past 25 years remarkable progress has been achieved in promoting education throughout the world, but as C.E. Beeby and L.J. Lewis recently pointed out, educational planners lack a body of theory that takes account of all that has happened in education in this period 'during which educational events have far outstripped our capacity to think about them'.(1) Given this situation it seems important at the present time to bring into sharper focus a variety of key issues which appear to be of universal concern, rather than to seek final answers. This can seemingly best be done not by abstract theorizing, but by examining the actual experiences and conditions of education systems in a variety of areas. It was against this broader background of research needs that this work was undertaken. The general aim was to examine and account for the nature of government education policy and to highlight the difficulties experienced since the second world war.

The study was arranged on a chronological basis in order to maintain a sense of historical perspective, a component of educational planning which is perhaps not emphasized as much as it deserves. The early chapters provided an introduction to the physical and cultural milieu of Fiji, the development of British colonial educational policy between the two world wars, and an analysis of educational development in Fiji prior to 1939. The latter followed a pattern typical of most Crown colonies. Educational initiative was left to the Missions and other voluntary agencies. In the case of Fiji, the importation of many thousands of indentured Indians in the period 1879-1916 gave rise to numerous Indian cultural groups establishing their own schools. By 1939 the colony had a familiar array of educational problems. Provision for schooling fell far short of social demand, especially amongst the Indian population; the quality of schooling was very poor; schools were segregated on racial lines; the majority of children who did go to school only stayed on average for about three years; there was much repetition of grades; the training and supply of teachers was inadequate; very few girls received any schooling; the colonial administration exercised only minimal control over the establishment and running of schools; and there appeared to be little or no likelihood of any substantial infusion of finance to remedy the situation. Then came the war, the British Government's revised colonial development and welfare policy, and the arrival in Fiji

(1) C.E. Beeby and L.J. Lewis: "Introduction" to the special review number on Education in Developing Countries, International Review of Education, Vol. XVII, 1971, pp. 131-137.

in late 1942 of Governor Philip Mitchell. Ostensibly he went to the South Pacific 'to wage war' against the Japanese but he also found time to concern himself with education in Fiji and was directly responsible for arranging for F.B. Stephens, a New Zealand 'administrative expert' to visit Fiji in 1943 to make a report on education.(2) Stephens was very critical of what he saw and convinced of the need for sweeping changes including a government take-over of most of the schools. F.R.J. Davies, a fellow New Zealander and the Acting Director of Education at the time, was given the unenviable task of drawing up a ten year development programme for education on the basis of the report. While Davies endorsed much of what Stephens had said, he was convinced that the report was politically unacceptable to the Fiji administration and the Colonial Office alike. Accordingly he spent many months working out a compromise agreement between the various interested parties. The eventual outcome was given guarded approval in London and the Ten Year Plan was launched in 1947 as part of a general development programme.(3) Within a year financial problems caused the plan to be curtailed, but not before a Government Teachers' College was established at Nasinu.

Throughout the early 1950s education suffered from inadequate funds and progress was slow. Adequate provision for schooling was made especially difficult by the rapid growth of Fiji's population in the post-war period. The 1946 Census also showed that Indians outnumbered Fijians for the first time. The rapid growth of the Indian population created a serious political problem. The Indians rapidly gained a monopoly of education and a serious imbalance began to develop between the numbers of educated Fijians and Indians.

In the late 1950s, Fiji's economy began an expansionist phase as sugar prices improved and this was reflected in education by a significant expansion of schooling, especially at the secondary level. At the same time the Government attempted to exert some control over the quality of secondary education by offering grants-in-aid to selected schools. Efforts were also made to encourage secondary schools to broaden their curricula to include practical subjects but the traditional desire for academic education proved too strong and only very limited progress was made in that direction.

The quickening pace of educational growth in the late 1950s broke into a distinct gallop in the sixties. This was due to several reasons. Education assumed an economic importance in the minds of Fiji's development planners, the growing population created an ever rising social demand for more schooling, and the economy continued to expand. Nevertheless, despite the impressive growth of enrolments the quality of instruction in many schools remained poor. Schools were inadequately equipped and there was a high proportion of untrained teachers in charge of classes. In 1965, Fiji drew up its fifth post-war development plan (DPV)(4) which included the most comprehensive programme for educational development since 1945. However, in spite of the obvious qualitative deficiencies in the schools, the main emphasis was still placed on the provision of more schools, especially at the secondary level, to meet social demand. By the late 1960s the lack of educationally well-qualified Fijians was assuming grave dimensions.

---

(2) F.B. Stephens, Report on Education in the Colony of Fiji, Fiji Legislation Council Paper (FLCP) 18/1944.
(3) Plan of Development for the Educational System in the Colony of Fiji FLCP 27/1946.
(4) Fiji Development Plan 1966-1970. FLCP 16/1966.

In 1969, the education system was the subject of a Commission of Inquiry headed by Sir Philip Sherlock.(5) The Commission was established at the request of the Education Department and the Fijian Affairs Board. The Department felt that Fiji was fast reaching a decisive point in its educational development and that a variety of costly decisions needed to be made. The Director of Education thought there was more chance of the Government voting the necessary funds if the recommendations came from an outside body. The Fijian Affairs Board had been concerned with the poor educational attainments of Fijians for several years and sought an investigation into the matter. The Commission emphasized the popular view that education was an investment of national importance, but it also warned against allowing the continued unplanned expansion of schooling prompted by social demand with its inevitable decline in standards and lack of matching employment opportunities for school leavers. Consequently the Commission recommended a slowing down in the rate of educational expansion in line with the supply of trained teachers. Much of the report was concerned with ways in which the quality of education could be improved. Major areas looked at in detail included the training and conditions of service of teachers, examinations, language difficulties, administration of schools, free and compulsory education, multi-racial schooling, and the future of secondary education. The final list of recommendations endorsed most of the ideas that the Education Department was trying to get included in the country's sixth development plan (DPVI), including the need to strengthen teacher-training and the importance of curriculum revision, both costly items to put up to the Government for priority rating in the face of strong popular demands for free and compulsory primary schooling.

In October 1970, Fiji became independent and soon afterwards DPVI was formally adopted.(6) It was the most ambitious and comprehensive planning exercise ever undertaken in the territory and was designed to shape the social and economic growth of the early 1970s. The educational component of the plan incorporated the educational objectives of the new ruling Alliance Party headed by Ratu Sir Karisese Mara. These included provision for a minimum of ten years of schooling for all children up to Form Four; a substantial improvement in the quality of teacher-training; the staffing of all primary schools by trained teachers, and smaller classes; increased equipment for secondary schools and curricula revision; the gradual introduction of fee-free education up to Form Four; measures to overcome the poor overall level of educational attainment by the Fijians; an extension of technical and vocational education; and the eventual assumption by Government of full financial responsibility for all schools willing to hand over these responsibilities. While it is evident that a strong emphasis was placed on improving the quality of education, it is perhaps even more significant to note that the overriding accent on quantity was still uppermost. Despite the Education Commission's main charge that successive Administrations had put quantity before quality, the social pressure for more education seemed to be the paramount concern of Fiji's politicians.

A major feature of DPVI was the provision for a network of junior secondary schools to cater for children after they have completed a basic six year programme of primary schooling. It is hoped that these schools, many of which are being located in rural districts, will help to overcome the premature drop-out of many Fijian children whose parents cannot afford to pay boarding

(5) Education for Modern Fiji. Report of the Fiji Education Commission 1969. FLCP 2/1970.
(6) Fiji's Sixth Development Plan 1971-75. Central Planning Office, Ministry of Finance, Suva, Nov. 1970.

expenses for them in secondary schools in urban areas.

To achieve many of the Government's educational aims it is essential to control and decelerate the rate of population growth. Fortunately a vigorous family planning campaign is having an effect and it is hoped that 100 per cent primary school enrolment can be achieved in the late 1970s. It might then be possible to introduce compulsory primary education.

Since independence educational progress has moved steadily forward but a wide array of problems remain, especially in determining priorities when confronted with limited financial and manpower resources. Perhaps the most pressing problem facing educational administrators is how best to gain effective control of the education system so that an ordered list of priorities can be adhered to. This is a concern that has existed throughout the post-war years. The problem has arisen from the fact that virtually all Fiji's schools, of which there are over 750, are run by voluntary agencies. The Government can suggest and encourage various developments but it cannot force school committees to adopt new ideas. The Education Commission was very critical of private management of schools and recommended the gradual phasing out of the voluntary system and the adoption of a public system of schools operated by the Government. So far this suggestion has been resisted on financial grounds but now that the Government is heavily subsidizing the schools, it seems a logical step in the near future for it to assume direct responsibility for their well-being.

THE POPULATION EDUCATION RESEARCH PROJECT

Dr. Abu Hamid Latif, Institute of Education and Research,
University of Dacca

The introduction of population education in the school system of the country is a major component of the population planning programmes of the Government of the People's Republic of Bangladesh. While the Government agencies were busy in policy-making, the Institute of Education and Research of the Dacca University took the lead in this regard and launched a two-year Pilot Research Project on Population Education.*

PURPOSE AND SCOPE

The purposes and scope of the Population Education Research Project are:

(1) Development of Population Education materials for both students and teachers;

(2) Testing of the materials in actual classroom situation;

(3) Evaluation of the materials and other aspects of the programme;

(4) Consolidation and analysis of the findings in the form of a published research report.

The operation of the project activities is confined in two selected thanas (counties) of the country - Mirzapur in the district of Tangail and Ishurdi in Pabna. All the fifty-five secondary and junior secondary schools of these two thanas have been brought under the purview of the project. The total number of 9395 students of Class VI, VII and VIII of these schools constitute the population of the main aspect of the research project. The subject teachers of general science and social science - subjects related for introducing population education - of these schools form the second treatment population. The project activities in functional terms include developmental activities, experimentation and evaluation, research and finally writing of the research report.

THE FIRST YEAR

The activities and accomplishments of the project during the first year i.e. July 1974 to June 1975 are stated hereunder:

Developmental Activities

1. Establishment of Resource Centre on Population Education initially with the collection of materials from the project personnel. Later, large quantity of population education and related materials from the Ford Foundation and other international agencies were acquired.

2. (a) Selection of two thanas Mirzapur and Ishurdi, having 55 secondary schools with an enrolment 9395 in grades VI, VII and VIII, as experimental areas of the project on the basis of certain criteria.

(b) Selection of school subjects and survey of contents for identifying the nature and quantum of population related elements in the existing textbooks of these subjects.

(c) Development of general objectives for introducing population education materials in the grades and subjects selected.

(d) Selection, in the light of general objectives, of the broad areas wherefrom population education curricula were to be developed.

(e) Selection of appropriate topics from the existing textbooks in social science and general science for integration of population education materials and determination of the nature and process of integration.

(f) Development of population education sample materials on the average of 14 lessons for each of classes VI, VII and VIII in general science and social science subjects along with teaching guides for the teachers of these subjects.

(g) Development of testing instruments to be administered to headmasters and teachers attending workshops.

(h) Holding the first workshop for headmasters and teachers concerned and reviewing the sample teaching materials for students and teaching guides for teachers.

(i) Finalizing the reading materials and teaching guides and developing teaching aids and testing instruments for the students and having these materials printed.

(j) Holding second workshop for presentation of printed materials to teachers concerned and for orientation of the teachers.

These developmental activities were completed within a period of eight months (July 1974 to February 1975) and with that the first phase of the Project activities was over.

Experimentation and Evaluation

The second phase which relates to experimentation and evaluation of population education materials began from 15th March1975 when the participating schools started teaching population education materials in grades VI, VII and VIII in their respective schools. This phase will continue till the end of the school year in December 1975. While the schools teach the materials, the project personnel will make periodic visits to schools for observation, discussion and evaluation of materials, performance of teachers and other aspects of the programme. During the first quarter of 1976, the findings of the experimentation and evaluation of different aspects the project will be analysed. The research report is expected to be published by the end of June 1976.

CURRICULA AND READING MATERIALS DEVELOPMENT UNDER THE PROJECT

The population education research project envisaged, among the activities, the development of curricula and reading materials for classes VI, VII and VIII. The research team, after considerable discussion and careful consideration, decided that population education materials would be integrated into the school subjects of general science and social science. A survey of six textbooks, three in social science and three in general science, two each for Class VI, VII and VIII was conducted with a view to identifying the extent and nature of population education related contents in the textbooks published by the Textbook Board and to locating the appropriate places for meaningful integration of population education materials. Then the researchers focused their attention to the task of deciding the objectives of population education. In doing so, they went through the available literature on population education and after a lengthy deliberations, decided the following objectives to be achieved through the introduction of population education materials in the selected classes.

1. To create population awareness through a study of population situation in the family, community, country and the world.

2. To help understand and comprehend the causes and consequences of high population growth in the country.

3. To develop awareness about the need of maintaining balanced relationship between the size of population and the environment and the natural resources obtaining within the country.

4. To develop attitudes so that in adult life the learners take rational decisions about family size and can intelligently participate in matters related to population policies and programmes.

5. The learners will share their knowledge and values related to population with their peer groups and families in their own environment.

The next step was to identify the broad areas related to population situation, issues, problems and consequences that would help develop population education curricula for the selected subjects. The broad areas identified were: the population phenomenon, the population characteristics, causes of high population growth, consequence of rapid population growth on food and health, economic consequences, social consequences etc.

The population education curricula thus developed, was again divided for classes VI, VII and VIII and this was done purely on the judgement and consensus of opinion of the researchers. The researchers also decided to develop lessons mostly for one class period closely linked with topics or sub-topics earlier identified during the survey of textbooks. A uniform pattern was followed for integrating the lessons with related topics. Considering the total course-load and load of the selected subjects for each grade, the researchers decided not to develop more than eight lessons in each subject for a particular class.

The writing of the lessons along with lesson plans was distributed among the subject specialists of the research team. In the course of writing the reading materials, frequent group discussions were held with the purpose of

full exploitation of the combined intellectual resources of researchers and for resolving controversial points, sharing each others experiences and maintaining vertical integration. The materials thus developed by the researchers were scrutinized and reviewed in a series of long sessions by the members of the research team.

The revised draft reading materials in the form of lessons and lesson plans were presented in the first workshop of headmasters and subject teachers. General and group discussions were held by the teachers. The teachers were provided with evaluation sheets and were asked to evaluate each lesson and lesson-plan. They were also asked to give their overall opinion about the materials in writing.

In the light of the evaluation and teachers opinion, the lessons and lesson-plans were reviewed, revised and finally rewritten. Besides lessons and lesson-plans, the researchers developed some background materials for the teaching guides. Topics included as background materials in the teaching guides were: goals and nature of population education; necessary data for information related to population education; the consequences of population growth in Bangladesh; Bangladesh and other countries of the world - a comparison; some aspects of the world population problem; population: food, health and environment.

An editor, outside the research team, was appointed for editing all materials. The edited materials were printed in the form of booklets and were finally presented to the teachers in the second workshop for a general reading of the materials. The participating teachers were given the required number of booklets for distribution among the students in their respective schools.

TRAINING OF TEACHERS UNDER THE PROJECT

Population education being a new educational programme and that too being a goal-oriented programme, the training of teachers assumes greater importance. In designing the programme activities for this project, this particular aspect was given due and proper attention. Provision was made in the project proposal for two workshops - the first one for headmasters and subject teachers of the participating schools and the second one for the subject teachers only. Although the duration of workshops was give days, adequate preparations were taken for maximum utilization of time in a planned manner.

The workshops were conceived not only for orientation and training but also as a forum for participation by the headmasters and teachers in the development of reading materials and in planning the implementation of the programme. The training of teachers in this project constituted two main components: one was comprehensive understanding of teachers about population related matters and the other was related to teaching of population education. The novelty of the training programme was the involvement of the teachers in the development of reading materials for students and teaching plans for lessons on population education. The second workshop was, however, mainly devoted to training of teachers for teaching population education materials developed in general science and social science subjects.

DEVELOPMENT OF TEACHING AIDS UNDER THE PROJECT

Due importance was attached to selection and proper use of appropriate teaching aids by the classroom teachers. The project personnel with the help of professional artists developed a set of pictures and illustrations related to different lessons on population education and these aids were manifolded in sufficient quantity. The map of Bangladesh was another important aid needed by the teachers. This was procured from the audio-visual centre, Dacca. In the second workshop, these pictures, illustrations and maps were presented in special sessions and the teachers were given training as to how to use them properly. Moreover, during the training period, the teachers were asked to develop more teaching aids related to specific lessons as they continue teaching the materials.

EVALUATION PROCEDURE FOR THE PROJECT

The scheme for evaluation of the project activities as well as the outcomes of the experimentation with curricular materials consists of several different steps to be taken on a multidimensional approach of measurement. Some of these steps have already been taken and the remaining ones are to be taken according to a sequence in the scheme.

A Pre-Test for the participating headmasters and teachers of the first workshop was administered which consisted of two parts - the first part of the test was an achievement test containing 40 multiple-choice items on demographic and population related information and ideas. The second part of the test contains 30 items and was designed to measure attitude of teachers towards demographic and population problems of Bangladesh and their possible solutions. A five-point rating scale is used to record the answer choices for each item.

An opinionnaire in 3 parts was administered to the participants in the concluding session of the first workshop. The first part of this is a 38 items questionnaire dealing with various curricular aspects of the lessons on population. This was designed to evaluate the feasibility of the curricular materials as well as the training procedure. The second part is a 12 items, five-point rating scale, designed to evaluate the feasibility of each lesson and lesson-plan separately for each class and subject. In addition to this, the participants of the first workshop were also requested to put in writing evaluative comments in the margin of each draft lesson and lesson-plan. Data thus obtained were duly analysed and the result of this analysis provided the objective bases for modification of the curricular materials.

An equivalent version of this opinionnaire is being developed to administer to the participating teachers of the schools concerned at the end of the academic year 1975. The information to be obtained will be utilized for evaluation of the feasibility of the entire series of activities concerning the pilot project on Population Education in Bangladesh.

Special Examination of Students

On the last day of the second workshop necessary materials were given to the teachers to administer Pre-Test of the students and necessary instruction

regarding the process and method of administering the test was given to them. The first part of this test is an Attitude Scale of five point rating scale containing 50 items on population problems and their possible solutions. The second part of the special examination consists of an Achievement Test for each of the three Classes VI, VII and VIII. The participating teachers of the second workshop were instructed to administer both parts of the special test just prior to the beginning of teaching population education lessons designed for the project. Accordingly, the teachers had administered the test in their respective schools and sent the materials to the Research Services Centre which are being analysed.

By the end of the academic year 1975, when the teaching of the population education contents will have been completed, the above mentioned special examination will again be conducted in the selected schools as a Post-Test, using the same tests.

The data obtained by pre-testing and to be obtained by post-testing is expected to provide information concerning effects of the experimental variables on the primary target population and so to provide basis for testing the feasibility or relevance of some of the important assumptions of the researchers.

Internal Evaluation

Teachers are required to evaluate the students' achievements by internal classroom examinations. To maintain uniformity of practice among the participating schools, the classroom teachers have been instructed to evaluate the performance of each student on each lesson in a specified manner and record the same in a special register supplied to them.

* The project team comprised the author and Drs. Md. Selim, Noorul Huq, Mazharul Haque, Obaidur Rahman, Nurunnahar Fayzunnessa and Mr. Iqbal Aziz Muttaqui.

PROBLEMS OF EDUCATIONAL GROWTH IN UNDERDEVELOPED COUNTRIES A STUDY OF THE QUANTITY-QUALITY DILEMMA IN THE AFRO-ASIAN REGION

Dr. C. Whitehead
Education Department, University of Otago
Dunedin New Zealand

Initial interest in the subject stemmed from working with Dr. Richard Seddon, formerly with the South Pacific Commission and latterly Professor and Head of the School of Education, Macquarie University, Sydney, and from a study of the work of Dr. C.E. Beeby on the quality of education in developing countries.(1) Several of Beeby's conclusions and the evidence contained in Unesco reports of education in various Afro-Asian countries appeared to cast grave doubts on the merits of the Karachi and Addis Ababa Plans as suitable guides for the future development of education in those regions. This was particularly so with respect to the strong emphasis placed on the rapid expansion of education, especially at the primary level. Beeby and P.H. Coombs(2) have also focussed attention on the internal dynamics of education systems and their potential for growth, and a closer study of the subject seemed particularly relevant to the doubts expressed about the Karachi and Addis Ababa Plans. The past two decades have seen a great expansion of schooling in Africa and Asia but the level of educational wastage as judged by the number of pupils who drop out prematurely from school or who repeat grades still remains depressingly high and shortages of competent teachers, adequate school buildings and classroom equipment remain as acute as ever. Regrettably, one is forced to conclude that many of the human and financial resources that have been used to expand educational opportunities in underdeveloped countries since the early 1950s seem to have been wasted.

Since the second world war there has been an unprecedented social demand throughout the world for greater educational opportunities based on the concept of human rights. At the same time, education has become widely recognised as an essential component in the promotion of social and economic development. The Karachi and Addis Ababa Plans were expressions of these two beliefs. Both plans were designed to encourage rapid educational growth on a broad front over a twenty-year period. The Karachi Plan aimed at free and compulsory schooling of seven years duration for all children by 1980 in fifteen Asian countries. The Addis Ababa Plan similarly aimed at universal primary schooling of six years duration throughout Africa by the same date.

---

1. C.E. Beeby: The Quality of Education in Developing Countries, Harvard University Press, Cambridge, Mass. 1966.
2. P.H. Coombs: The World Educational Crisis. A systems analysis. Oxford University Press, New York, 1968.

These targets confronted all participant countries with a gigantic task. In Asia, it was estimated that primary enrolments would need to rise from 66 to 237 million by 1980.(3) About 9 million additional teachers would be required(4) and the total recurrent and capital cost was tentatively put at 56,000 million American ollars.(5) In Africa, it was calculated that primary enrolments would need to increase from approximately 11.5 million to about 33 million over the same period.(6) No overall costing was attempted but it was described as 'staggering'. All African countries were urged to raise the percentage of their national income earmarked for financing education to a minimum of 6 per cent of their gross national expenditure by 1980.(7) In both plans it was recognised that vast amounts of foreign aid would be needed if the targets were to be reached. The quality of education was not ignored but it was greatly overshadowed by the emphasis placed on growth. Neither document was a plan in the strict sense of the word but both served to define targets to be reached at the national level and to highlight the immense magnitude of the educational problems facing each region.

To assess the appropriateness of the plans as national guides, detailed studies were made of education in Ethiopia, Cameroon, Tanzania, Indonesia and Thailand. These countries were chosen partly on grounds of access to primary source material but also because they were thought to be representative of the various stages of educational development to be found within the countries of the Afro-Asian region. Space precludes any detailed account of these studies but several general conclusions emerged. To a greater or lesser extent there were serious qualitative deficiencies in the schooling provided, especially at the initial stage of the primary level. Consequently the wastage rate was high. The supply of well-educated and trained teachers was also woefully inadequate. Schooling also suffered from inadequate and overcrowded buildings, a dearth of teaching materials, lack of regular inspection, and dull, factual and formal instruction. Language difficulties also presented a major barrier to progress especially at the secondary and tertiary levels. Lack of finance was clearly a fundamental problem in each country but manpower shortages and long-established cultural attitudes towards education also contributed substantially to the poor overall quality of schooling. In each country studied the same basic conclusion was reached - that the Karachi and Addis Ababa Plans were not appropriate models on which to base future educational development.

The second half of the study looked more closely at the wastage problem and at the internal dynamics of education systems in general, in order to assess the feasibility of expanding the size of an education system rapidly and simultaneously maintaining an acceptable balance between the quantity and quality of schooling. Economic reasons were clearly of major importance in contributing to the wastage problem but perhaps more research needs to be done into the cultural and educational reasons for pupils leaving school before they have completed their basic education. Both Adam Curle and John Cameron have stressed the unpleasantness associated with school for many young

---

3. The Needs of Asia in Primary Education. A Plan for the Provision of Compulsory Primary Education in the Region. Educational Studies and Documents No. 41. Unesco, Paris 1961. p.8.
4. Ibid., p.15.
5. Ibid., p.28.
6. Outline of a Plan for African Educational Development, Addis Ababa, 1961. p.14.
7. Ibid., p.19.

children. Classes are often overcrowded, discipline is harsh, and the teaching is dull. In short, 'The children have a tough and unpleasant time at school'.(8) As Cameron has commented, children all over the world 'play hookey' for substantially the same reasons and researchers looking into the causes of wastage might be well advised to begin their work by re-reading Tom Sawyer and Huckleberry Finn.(9) The dull and formal teaching encountered in so many schools is only to be expected when the majority of teachers are untrained and poorly educated. Moreover, in many cases teachers have only turned to teaching as a career after having failed to obtain more lucrative and acceptable employment elsewhere. The unfortunate classroom experiences of children are doubtless also responsible for the irregular attendance of many pupils which in turn contributes to the frequent repetition of grades.

The internal dynamics of education systems were looked at in relation to the factors which seem to govern the qualitative growth of schooling and thereby the speed with which an education system can be expanded profitably. The factors were grouped under seven headings - teachers, pupils, schools, language problems, administration and control of education, finance, and public and professional attitudes to education. While each heading was dealt with separately it is necessary to bear in mind constantly that the factors are all closely related and that it is their combined effect which ultimately determines the quality of education prevailing at any one time.

The section on teachers dealt with the problem of recruitment and training, salaries and salary structures, career opportunities, the employment of men as opposed to women, conditions of service, shortages of teachers in specific areas such as science and technical subjects, and the social and economic pressures bearing on the work done by teachers. The section on pupils dealt specifically with the influence of home backgrounds on schooling, the attitudes of illiterate parents towards their children's schooling, the contrasting and often conflicting pressures exerted on pupils by the school and the home, and the impact on student behaviour, especially at the secondary and tertiary levels, of the fear of failure. The section on schools included an analysis of the nature of school buildings and general classroom conditions, and the availability of teaching equipment and pupil texts. As Howard Hayden has said of Asian schools, 'In many instances a trained teacher is sent into a school equipped solely with a blackboard, a stick of chalk and his own courage'.(10) In many cases even blackboards and chalk are difficult to procure and children have to use slates or write in the sand because there is no paper. This means that the recording of work becomes impossible. Hence the emphasis is on rote memorization. Overcrowded classes are another characteristic of many schools. Pierre Rondiere has referred to 'The Wall' of repeating students which progressively paralyze the already weak educational system by blocking the promotion of new pupils from below and also the admission of new entrants.(11) The subject matter taught in the schools is also still frequently entrenched firmly in the cultural mould of the colonial era. Finally, the urban or rural location of schools may have a major bearing on the quality of schooling offered.

---

8. Adam Curle: Educational Problems of Developing Societies, Praeger Publishers, New York, 1969, p.52.
9. John Cameron: Wastage in Tanganyika with special reference to Primary Schools, Teacher Education in New Countries, Vol.6, No.2 Nov. 1965, pp.113-114.
10. Howard Hayden: 'Director's Report', Vol.1, Higher Education and Development in South-East Asia, p.57.
11. Pierre Rondiere, Education ... But for Whom? ... and How? Unesco Courier, 23rd Year, Jan. 1970, p.8.

Hayden has suggested that the language difficulty is the most important factor retarding the advancement of educational standards in Asia.(12) Quite apart from the wide variety of indigenous languages spoken in most underdeveloped countries, there is the inescapable necessity to master a European language like English or French in order to advance to secondary or tertiary levels. Moreover, the basic difficulties that most students experience in learning a foreign language are compounded in underdeveloped countries by the poor quality of teaching.

The quality of education is also directly influenced by the way the schools are administered and controlled. Under colonial rule, the government generally established an administrative and legal framework for education but left the setting up and daily running of the schools to private initiative. This system operated well enough when there was limited demand for education but since the emergence of independent states in the late 1950s, the scene has changed radically. Nowadays, governments in most underdeveloped countries have assumed responsibility for the development of education. This in turn has created a problem of who shall administer and control the schools. If education is to be planned and scarce resources are to be used efficiently it is imperative that a government has the ability to initiate and control educational development at all stages, but this may not be compatible with the continued existence of private schooling. The need for an inspectorate to enforce minimum standards of schooling is also essential if the quality of education is to be safeguarded and upgraded. This section of the study also looked into the advantages and disadvantages of centralised as opposed to decentralised control and at the problems created by regional variations in educational provisions.

The section on finance was primarily concerned with the high unit costs imposed by high wastage rates, the problems associated with the recurrent cost structure of education systems, and the particular problems associated with teachers' salaries in relation to other skilled manpower groups and the wage structure generally in underdeveloped countries. As P.H. Coombs has commented, if teachers' salaries do not keep pace with those of other comparable groups then an educational version of "Gresham's Law" goes to work, and the quality of the teaching force deteriorates still further.(13)

The section on public and professional attitudes towards education drew on the colonial legacy and Beeby's work on the causes of professional conservatism in education.(14) Paradoxical though it may seem, it is the education systems in underdeveloped countries which appear to be the most resistant to change. Many people in Africa and Asia still cling tenaciously to the educational ideals of former colonial days. This is reflected in the continued reluctance to abandon traditional academic courses in favour of practical or technical subjects. To go to the city to further one's studies and then return to live in the village is still unthinkable in many countries - it would be an admission of failure. By the same token, as long as society continues to condone a liberal, academic type of education as the principal means to top administrative jobs and the social status that goes with them, people will seek it whatever the arguments advanced in support of alternatives.

---

12. Op.cit., p.240.
13. Op.cit., p.129.
14. Op.cit., pp.29-47.

This study was made approximately a decade after the Karachi and Addis Ababa Plans were drawn up and adopted. During that time commendable progress was made in expanding educational opportunities in the Afro-Asian region but even as early as the mid sixties international concern was being expressed at the qualitative shortcomings of education in Africa and Asia. In 1965, Asian ministers of education meeting in Bangkok expressed misgivings at the high drop-out rates and shortages of qualified teachers. The trend was continued in 1968 at the fourth Commonwealth Education Conference at Lagos and at the meeting of African ministers of education in Nairobi. The quality of education was also the principal theme at a Unesco-sponsored conference in Paris, in the same year. Finally, a similar concern was voiced at the meeting of Asian ministers of education held at Singapore in 1971. By the early 1970s it was apparent that the Karachi and Addis Ababa Plans had outlived their usefulness. No doubt they had served a useful purpose in the early 1960s in focussing attention on the need for more education but by the early seventies educational planning was entering a new phase in which concern for quality was assuming a new emphasis. The experience of the 1960s demonstrated in unmistakable terms that 'In education more than elsewhere quantity is often the enemy of quality'.(15) Perhaps Guy Hunter best summed up the situation regarding education in underdeveloped countries at the end of the sixties when he stated that it was necessary 'to put a driving belt on the wheel, now beginning to spin wildly'.(16)

In the concluding section of this study a survey was made of various attempts being made in Malaysia, Thailand, Ceylon, India, Laos and Tanzania, to reduce the wastage problem. Many factors are involved in upgrading the quality of education but none is more vital than improving the training of teachers, but this is a difficult and time-consuming process. Moreover, the new subject-centred approach to learning in which the basic aim is to help the child discover the structure of subjects and knowledge for himself imposes new burdens on teachers and makes the task of teaching more sophisticated than previously. In future, teachers will need a much deeper appreciation of both their subject and the pupils they are teaching than was necessary for drilling a class in the rote memorizing of a set of relatively disconnected facts. Furthermore, modern technology may help teachers to do their job more efficiently but it can never replace them and so far there is little positive proof to suggest that new teaching methods can save money. Finally, experience has shown that if educational planning is to be effective the education system must be viewed as an organic whole in which each level and component is intimately related.

> A university may be the crown of the educational pyramid but if the imposing concrete buildings of the university rest on rather shaky timber in the high schools, and they again on the flimsiest bushpoles and kunai grass in the villages, the structure will be decidedly unstable.(17)

---

15. Louis Francois, The Right to Education, Unesco, Paris, 1968, p.39.
16. Guy Hunter, The Best of Two Worlds? - A Challenge on Development Policies in Africa, p.97.
17. Report of the Commission on Higher Education in Papua and New Guinea, Canberra, 1964. p.30

Printed and published by
The Commonwealth Secretariat

May be purchased from
Commonwealth Secretariat Publications
Marlborough House
London SW1Y 5HX

ISBN 0 85092 131 7

ISBN 978-1-84859-254-4

9 781848 592544