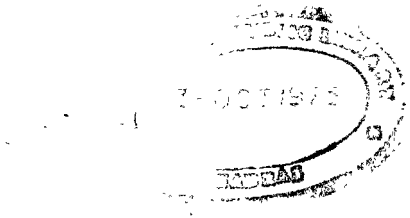
EFFECTIVENESS OF KINDERGARTEN EDUCATION

Report of an Investigation

National Council Of Educational
Research And Training



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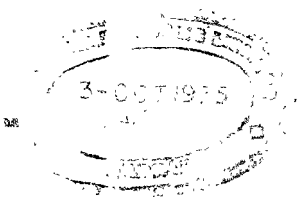

K. G. DESAI

NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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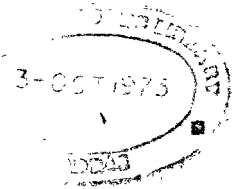

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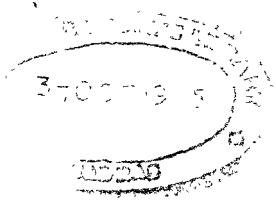


PREFACE

Pre-primary education is expanding in our country day by day, but the way in which it is being conducted leaves much to be desired. Many private pre-primary schools or balwadis are just run to relieve parents of the trouble of looking after their children for a few hours and to help the proprietor to earn his or her living. Even the better types of balwadis are not clear in their aims. They try to do a part of the work of primary schools by teaching children the three R's at an early age. Most of the parents also like their programme thinking that their children are benefited by the early schooling. In fact, children start their primary schooling at a much earlier age in our country than in many advanced countries. A child is admitted to the first grade of our primary school on completion of five years of age in most of the states in India, while in the West his counterpart is admitted to school on completion of six or seven years of age. Early admission to school robs the child of all opportunities of benifiting from experiences of spontaneous play. Without proper maturation he is not able to benefit from the education he gets.

Nobody has questioned whether the type of schooling that the child is subjected to in our balwadis achieves even the aims with which it is given. An attempt was, therefore, made to study the effectiveness of two years of pre-primary education given in good balwadis. The investigation was conducted by controlling as many variables as possible and keeping only one experimental variable, viz., two years of pre-primary education. Two comparable groups in the same class of grade four of each of the six schools in Ahmedabad city, one with pre-primary education and the other without it, were formed with one-to-one matching of IQs. They were administered achievement tests in four subjects, viz., language, social studies, arithmetic and science. A handwriting scale and a personality rating scale were also administered. The two groups did not show significant difference in

achievement in the four academic subjects as well as in handwriting. The investigator, therefore, came to the conclusion that the kindergarten education of two years does not raise the child's achievement level in subjects taught in the primary school. The results of the personality rating were inconclusive.

The investigation was started in June, 1969 and was completed in March, 1970.

This study has obviously many limitations and, therefore, its results are to be interpreted with caution. In the first place it does not categorically prove that kindergarten education is useless. It only shows its fruitlessness in the matter of achievement in the subjects taught in the primary school. It may be possible to develop certain skills or personality traits in the pre-primary school which may be helpful to the child in life. Of course this hypothesis also needs to be verified.

The second limitation of the study is that it was carried out in only six schools of Ahmedabad city and in order to control other variables, two groups of children had to be formed in the same class only. As a result, the sample in each group is small. The study is, however, replicated in six schools getting the same result. But perhaps because of the small samples, the difference in the achievement found does not remain significant statistically. Bigger samples are not possible to get, if we want to control teacher, environment and such other variables.

The third limitation of the study is that although the investigator selected good schools, they were not the best in the city. One or two primary schools which can be considered to be ideal ones could not be used as almost all the children therein had taken pre-primary education and there was hardly any body left out without it.

In spite of the above limitations, the study deserves attention, as it has for the first time questioned the blind faith in our educational practices.

The investigator acknowledges his sincere gratitude to the NCERT for the grant of Rs. 8,000/- for carrying out this study and also for publishing this monograph. The findings of this investigation were presented at the National Seminar on Primary

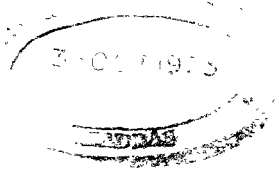
and Work Oriented Education held in New Delhi, in November, 1970 under the auspices of the NCERT and the investigator received a number of comments, both appreciative and critical during one of its sessions. He is thankful to all those who offered their comments.

The investigator is thankful to Miss Niranjan Shukla, Research Fellow who helped him in collecting and tabulating the data. He is also thankful to Shri J. H. Shah, now Principal of D. D. Choksi College of Education, Palanpur for his help in training the Research Fellow in administering his adaptation of the 1960 revision of the Stanford-Binet tests and also in the standardization of the achievement tests used in the study. He is also thankful to Shri Navin Shah for his secretarial help and for neatly typewriting the manuscripts of the report.

And lastly, the investigator expresses his sincere thanks to the Heads and teachers as well as the children of the six schools where he carried out this study.

Ahmedabad,
March 15, 1971

K. G. Desai



EFFECTIVENESS OF KINDERGARTEN EDUCATION

PROBLEM

Comparison of levels of achievement in academic subjects and of developmental tasks of primary school pupils who have attended a kindergarten school for two years before joining primary schools with those who have not.

INTRODUCTION

Pre-primary education has been flourishing in India day by day. Because of the influence of Madame Montessori who lived in India during the Second World War, balwadis or balmandirs had a good start in Gujarat particularly. Gijubhai Badheka in Bhavnagar championed the cause of pre-primary education in this part of the country and as a result kindergarten schools of two years' durations were established in many cities of Gujarat as early as in the thirties and have gone on multiplying. There is hardly any town with a population of 10,000 which does not have a kindergarten school at present and many villages with a population of 1000 also have one. The statistics given in the Kothari Commission report are a gross underestimate perhaps, because there are a number of kindergarten schools which are not registered anywhere. It is difficult to collect statistics of unregistered institutions, but they might outnumber the registered ones at least in this part of the country.

Most of these balwadis however are poorly staffed and ill-managed. Their usual function is to keep children engaged for about four hours a day in some sort of activity so as to free their parents from this responsibility. However it must be said to the credit of the educated parents that they have felt the need for some sort of pre-primary education for their children. Many of them feel that the State should undertake the responsibility of

running pre-primary schools. The Kothari Commission has considered this view but has recommended that the establishment and conduct of these schools should be left mainly to private enterprise at present because of the paucity of adequate resources and other priorities like primary education.[1]

This question needs to be solved academically however. If pre-primary education is effective in laying the foundation of education or in motivating the child for effective study later on, it should be the responsibility of the State to make adequate provision for it as there is no better investment of a nation's resources than that in education. If, however, pre-primary education is not effective in preparing a good foundation for further education, it should be left entirely to private enterprise or local authorities to provide it.

To find an answer to this question the experimental study described below was undertaken.

OBJECTIVES OF PRE-PRIMARY EDUCATION TO BE TESTED

There are many objectives to be achieved through pre-primary education. The Kothari Commission has stated them thus:[2]

"— to develop in the child good health habits and to build up basic skills necessary for personal adjustment, such as dressing, toilet habits, eating, washing, cleaning, etc;
— to develop desirable social attitudes and manners, and to encourage healthy group participation, making the child sensitive to the rights and privileges of others;
— to develop emotional maturity by guiding the child to express, understand, accept and control his feelings and emotions;
— to encourage aesthetic appreciation;
— to stimulate the beginnings of intellectual curiosity concerning the environment and to help him understand the world

[1] *Report of the Education Commission*, 1964-66 New Delhi: Ministry of Education, Government of India, 1960 p. 149
[2] *Ibid*, p. 148

in which he lives and to foster new interest through opportunities to explore, investigate and experiment;
— to encourage independence and creativity by providing the child with sufficient opportunities for self-expression;
— to develop the child's ability to express his thoughts and feelings in fluent, correct and clear speech; and
— to develop in the child a good physique, adequate muscular coordination and basic motor skills."

In order to achieve these objectives, the Commission has recommended a curriculum as follows:[3]

(a) Play activities.
(b) Physical training including simple exercises, dance and eurhythmics.
(c) Manual activities and play like gardening, simple chores, and participation in simple community efforts.
(d) Sensorial education using natural objects and specially constructed apparatus.
(e) Handwork and artistic activities involving the use of finger skills and tools; and activities like drawing, painting, singing, music and dancing.
(f) Learning activities including language; personal hygiene and health rules; elementary nature study involving contact with the physical plant and animal world; counting and arithmetic, etc.
(g) Self-service in school eleminating as far as possible the use of servants and adult helpers.

Although all items of this curriculum are important, the foundation of academic education through the primary school is to be laid on the contents given at (f) which includes language, science, arithmetic and social studies. It was therefore decided to concentrate on these academic subjects mainly to evaluate the effectiveness of their studies in the pre-primary school.

Havinghurst[4] has defined certain developmental tasks to be learnt during the later childhood or primary school period. They are:

1. Learning physical skills necessary for ordinary games

[3] *Ibid*, p. 150
[4] R. J. Havighurst, *Developmental Tasks and General Education*, New York: Longmans, Green and Co., 1962, pp. 17—18, 33—37.

2. Building wholesome attitudes towards oneself as a growing organism
3. Learning to get along with age-mates
4. Learning an appropriate masculine or feminine social role
5. Developing fundamental skills in reading, writing and calculating
6. Developing concepts necessary for everyday living
7. Developing conscience, morality, and a scale of values
8. Achieving personal independence
9. Developing attitudes towards social groups and institutions

It was thought of to test how far these developmental tasks of the primary school period are better learnt by those who have undergone pre-primary schooling for two years than those who have not.

HYPOTHESIS TO BE TESTED

In order to pin-point the objective of the present study as discussed above, the following hypothesis was set up :

The levels of achievement in academic subjects and developmental tasks to be learnt in primary school, of pupils who have attended a kindergarten school for two years are no better than those of pupils who have not attended a kindergarten school before joining the primary school.

In setting up this hypothesis the investigator is of the opinion that the things to be learnt in primary school need a certain level of maturity and any schooling before the children attain this maturity goes in vain. If this hypothesis is correct, those children who have had kindergarten schooling for two years should not show better achievement in primary school subjects than those who have not attended kindergartens.

It is very obvious that if the achievement of children in the first grade of the primary school is studied, those with kindergarten education will show better progress than those without. It was, therefore, thought advisable to study the relative achievement of both types of children when they have reached grade

IV, so that those who have joined primary school directly may get enough time to catch up with those of the other type. Grade IV is the stage when the children can be subjected to objective testing. Children below that level usually do not take tests properly. Moreover, a period of three years is not long enough to wipe out the effect of two years' pre-primary education, if any. And if two years' kindergarten schooling does not have appreciable effect on pupils' learning for a period of three or four years, such schooling is of no use.

PLAN AND PROCEDURE

It was planned to set up two groups of pupils studying in grade IV matched one to one on the basis of IQs and to administer achievement tests in language, social studies, science and mathematics and to compare their average scores on these tests. For other developmental tasks, it was planned to get personality rating by the teachers who had come in close contact with these pupils and to compare the averages of the two groups. As per this plan, the following procedure was adopted.

1. Five primary schools of a good standard having their own kindergarten classes of two years attached to them were selected for the investigation. One more primary school which did not have any classes attached to it was also selected for the purpose.

2. Two lists of pupils studying in grade IV in these schools (i) those who had had two years of education in the kindergarten class and (ii) those who had not had kindergarten education were prepared.

In the five schools with kindergarten classes attached to them, only those pupils who had attended kindergarten classes of the respective schools were selected. This was done to eliminate teacher, school and environmental variables and to ensure that all children had the same teachers to teach them and the same type of environment.

In the sixth school which had no kindergarten classes of its own, the group consisted of pupils who had attended all sorts of

balwadis and were taught by different teachers. This was done to study the effect of teacher, school and environment variables.

3. All pupils of the two groups were administered J. H. Shah's Gujarati adaptation of the Stanford-Binet (1960 revision). This is a recently adapted intelligence test standardized on Ahmedabad population.

4. Two groups of pupils (i) those who had had kindergarten education and (ii) those who had not had any kindergarten education were set up in each of the six schools matched one to one on the basis of IQs.

5. Four achievement tests in Gujarati, Social Studies, Science and Arithmetic covering the new syllabus introduced this year in grade IV, were constructed and standardized. A personality rating scale covering the remaining testable developmental tasks was prepared.

6. The four achievement tests and a handwriting scale standardized by the present investigator were administered to pupils of both the groups and their individual scores on the tests were obtained. The personality rating scale was explained to the teachers who had come in close contact with the pupils and they rated the individual pupils on the scale.

7. Means and standard deviations of the two matched groups in all the six schools were calculated. The SE of the difference between the means of the two groups were calculated and the significance of the difference was tested by the *t* test.

THE SAMPLE

Table 1 shows the schools selected for the investigation and the total number of pupils of the two categories in each of these schools as also the number of pupils matched one to one in the two groups.

All these primary schools are situated in Ahmedabad city and are of good standard. They are run by private trusts. The first five have their own kindergarten classes of two years' duration. The last one is attached to a primary teachers' training school and has no kindergarten classes. Some of the pupils who

were in this school had attended different kindergarten schools in the neighbourhood.

TABLE 1

THE SCHOOLS AND THE SAMPLE OF SUBJECTS FOR THE INVESTIGATION

Sr. No.	Name of the School	No. of pupils to whom intelligence test was administered		Sample for experiment	
		Group A (with K.G.)	Group B (without K. G.)	Group A (with K.G.)	Group B (without K. G.)
1.	Nootan Vidyalaya (NV)	26	15	15	15
2.	Navchetan Primary School (NPS)	17	13	10	10
3.	Unnati Kumar Mandir (UKM)	25	14	13	13
4.	Saraswati Kumar Shala (SKS)	28	15	15	15
5.	Diwan Ballubhai Primary School (DBPS)	15	21	14	14
6.	H. K. Experimental School (HKES)	48	26	25	25

TABLE 2.1

THE MATCHED GROUPS: NOOTAN VIDYALAYA

Group A (with K. G.)			Group B (without K. G.)		
No.	Name of the Pupil	IQ	No.	Name of the Pupil	IQ
1.	B. P.	117.85	1.	V. S.	116.80
2.	D. V.	103.15	2.	P. K.	100.00
3.	V. S.	97.90	3.	A. N.	100.00
4.	J. T.	96.85	4.	N. T.	100.00
5.	B. S.	95.80	5.	M. M.	94.75
6.	A. N.	90.55	6.	R. S.	90.55
7.	K. J.	90.55	7.	R. H.	90.55
8.	H. A.	92.65	8.	S. T.	90.55
9.	R. S.	93.70	9.	J. N.	91.60
10.	H. T.	92.65	10.	M. B.	90.55
11.	B. M.	88.45	11.	I. R.	87.40
12.	H. H.	85.30	12.	S. V.	85.30
13.	R. S.	85.30	13.	J. S.	86.35
14.	R. J.	82.65	14.	S. A.	84.75
15.	F. B.	79.95	15.	S. J.	83.20
	Mean = 93.05			Mean = 92.82	
	SD = 8.9			SD = 8.4	

Group A in the first schools is selected from only those pupils who attended the kindergarten classes of the *same* school.

Table 2.1 to 2.6 show the IQs of the pupils in the two groups matched one to one.

TABLE 2.2

NAVCHETAN PRIMARY SCHOOL

Group A (with K. G.)			Group B (without K. G.)		
No.	Name of the Pupil	IQ	No.	Name of the Pupil	IQ
1.	S. A.	113.65	1.	M. A.	111.55
2.	A. V.	111.55	2.	M. D.	111.55
3.	N. A.	101.05	3.	A. V.	101.05
4.	K. P.	103.15	4.	D. D.	100.00
5.	J. C.	103.15	5.	B. H.	100.00
6.	A. C.	95.80	6.	V. S.	94.75
7.	M. C.	86.90	7.	C. M.	86.35
8.	R. G.	82.15	8.	A. H.	84.25
9.	I. T.	79.00	9.	S. J.	80.05
10.	B. J.	64.30	10.	R. U.	63.25
Mean = 94.07 SD = 4.7			Mean = 93.26 SD = 4.5		

TABLE 2.3

UNNATI KUMAR MANDIR

Group A (with K. G.)			Group B (without K. G.)		
No.	Name of the Pupil	IQ	No.	Name of the Pupil	IQ
1.	M. R.	119.95	1.	B. M.	118.90
2.	M. B.	105.25	2.	U. M.	105.25
3.	K. A.	103.15	3.	J. J.	104.20
4.	U. M.	102.10	4.	J. N.	102.10
5.	M. C.	102.10	5.	A. R.	101.05
6.	R. D.	100.00	6.	P. K.	100.00
7.	B. S.	96.85	7.	G. R.	95.80
8.	J. G.	95.80	8.	J. J.	95.80
9.	V. K.	91.60	9.	S. L.	91.60
10.	K. R.	89.90	10.	F. T.	88.45
11.	C. K.	87.40	11.	K. G.	87.40
12.	S. R.	84.25	12.	M. B.	85.30
13.	M. M.	81.10	13.	R. H.	85.30
Mean = 96.88			Mean = 97.01		
SD = 9.8			SD = 9.2		

TABLE 2.4

SARASWATI KUMAR SHALA

Group A (with K. G.)			Group B (without K. G.)		
No.	Name of the Pupil	IQ	No.	Name of the Pupil	IQ
1.	S. M.	108.40	1.	H. M.	111.55
2.	I. N.	103.15	2.	C. N.	103.15
3.	P. S.	102.10	3.	D. N.	102.10
4.	R. M.	100.00	4.	G. G.	100.00
5.	A. G.	97.95	5.	V. H.	97.95
6.	R. A.	93.70	6.	S. M.	93.70
7.	V. D.	91.60	7.	L. R.	91.60
8.	B. G.	91.60	8.	I. L.	91.60
9.	R. M.	87.40	9.	M. R.	87.40
10.	B. D.	88.45	10.	Y. A.	86.35
11.	A. V.	89.50	11.	S. S.	86.35
12.	A. J.	84.25	12.	N. R.	85.30
13.	J. M.	74.80	13.	A. A.	74.80
14.	I. K.	66.40	14.	Z. A.	68.50
15.	I. S.	65.35	15.	H. B.	65.35
	Mean = 88.3			Mean = 89.71	
	SD = 11.4			SD = 12.3	

TABLE 2.5

DIWAN BALLUBHAI PRIMARY SCHOOL

Group A (with K. G.)			Group B (without K. G.)		
No.	Name of the Pupil	IQ	No.	Name of the Pupil	IQ
1.	K. S.	115.75	1.	J. I.	113.65
2.	R. A.	114.70	2.	D. T.	113.65
3.	S. M.	110.50	3.	M. T.	106.30
4.	J. N.	102.50	4.	S. C.	104.20
5.	M. H.	103.15	5.	N. K.	103.15
6.	M. C.	101.05	6.	N. R.	101.05
7.	D. C.	98.95	7.	S. S.	97.90
8.	M. G.	100.00	8.	M. B.	97.90
9.	S. A.	96.95	9.	M. B.	96.85
10.	J. P.	100.00	10.	K. H.	96.85
11.	H. C.	95.80	11.	A. R.	95.80
12.	A. M	94.75	12.	B. R.	92.65
13.	J. S.	93.70	13.	H. M.	92.65
14.	H. C.	84.25	14.	N. P.	84.25
15.	K. M.	85.30	15.	S. C.	86.35
	Mean =	99.86		Mean =	98.88
	SD =	8.8		SD =	7.8

TABLE 2.6

H. K. Experimental School

Group A (with K. G.)			Group B (without K. G.)		
No.	Name of the Pupil	IQ	No.	Name of the Pupil	IQ
1.	P. N.	114.70	1.	P. J.	115.75
2.	R. J.	110.50	2.	M. R.	110.50
3.	K. S.	110.50	3.	S. P.	110.50
4.	J. A.	111.55	4.	H. G.	111.55
5.	K. H.	109.45	5.	S. S.	109.45
6.	B. M.	109.45	6.	B. D.	109.45
7.	J. J.	107.35	7.	C. K.	106.30
8.	M. K.	108.40	8.	N. S.	108.40
9.	B. M.	104.20	9.	S. H.	105.25
10.	V. H.	101.05	10.	M. K.	101.05
11.	J. M.	98.95	11.	S. V.	100.00
12.	H. R.	100.00	12.	J. N.	100.00
13.	G. J.	100.00	13.	J. I.	100.00
14.	S. J.	95.80	14.	P. G.	96.85
15.	K. M.	94.75	15.	S. V.	93.70
16.	U. P.	90.45	16.	K. N.	90.45
17.	A. V.	25.75	17.	B. G.	91.60
18.	J. S.	87.40	18.	J. M.	87.40
19.	V. K.	86.35	19.	G. B.	86.35
20.	N. A.	85.30	20.	L. G.	83.20
21.	R. P.	77.74	21.	R. M.	81.60
22.	P. P.	86.35	22.	S. M.	81.60
23.	A. P.	86.35	23.	V. K.	81.60
24.	Y. D.	79.95	24.	H. M.	81.60
25.	S. D.	72.70	25.	B. J.	72.70
	Mean =	96.99		Mean =	96.68
	SD =	11.7		SD =	12.2

CONSTRUCTION AND STANDARDIZATION OF THE ACHIEVEMENT TESTS

The construction and standardization of four group tests of achievement for grade IV was a big task and so the help of two M.Ed. students was taken. They selected construction of achievement tests in social studies and arithmetic for their dissertation. A third student constructed achievement tests in Gujarati, did the item-analysis and prepared the final form of the tests. As he left the work at this stage the remaining work of standardization was done by the Principal Investigator with the help of the research assistant.

Since the tests were to be administered in the middle of the year, half the items were coined from the course content of the subjects for Std. III and half from that for Std. IV.

For selecting the good items, the method of selecting items from 27% upper and lower groups for determining the difficulty values and discriminating indices was used.

The final tests consisted of the following types and numbers of items.

---

* J. H. Shah constructed and standardized the achievement tests in science.

TABLE 3

TYPES AND NUMBER OF ITEMS IN THE ACHIEVEMENT TESTS

Subject	Types of Items	No. of Items in Each Type	Total No. of Items
Gujarati	All multiple choice		
	1. Similar Words	5	
	2. Opposite words	6	
	3. Word discrimination	8	
	4. Verb forms	8	50
	5. Similies	8	
	6. Story comprehension	5	
	7. Spelling	10	
Social Studies	1. Multiple choice — History	15	
	2. Recall — History	15	
	3. Multiple choice — Geography	10	50
	4. Recall — Geography	10	
Arithmetic	1. Mixed examples	20	30
	2. Mixed examples	10	
Science	Multiple choice	20	
	Recall	20	40

The sample for fixing up norms of the tests was drawn from schools in Ahmedabad and neighbouring semi-urban and rural areas. The details of the sample and other information about the norms are not pertinent for this investigation, as only the raw scores on these tests have been used here.

The handwriting scale by K. G. Desai gives age-wise median specimens of handwriting by urban, semi-urban and rural boys

and girls separately. Since no sex-difference is taken into account while matching the subjects one to one on the basis of their Stanford-Binet IQs, and since the whole sample is urban, the individual handwriting of the subjects was compared with the samples obtained from urban boys. The scores are given in terms of handwriting age of the subjects on this scale.

For the remaining developmental tasks viz. the competitive and cooperative behaviour that are the main components of socialization of children, a five-point rating scale was prepared and the teachers who had come in close contact with the subjects were trained to rate them on this scale.

The reliability and validity of the achievement tests are shown in Tables 4.1, 4.2, 4.3, 4.4 and 4.5.

TABLE 4.1

RELIABILITY AND VALIDITY OF LANGUAGE TEST

	r	SE_r
Reliability		
1. Split-Half Method — Odd and Even Numbers	0.82	0.016
2. Kuder Richardson Formula	0.90	0.015
Validity		
1. Achievement Scores & Score Marks	0.59	0.08
2. Achievement Scores & I. Q.	0.44	0.079

TABLE 4.2

RELIABILITY AND VALIDITY OF SOCIAL STUDIES TEST

	r	SEr
Reliability		
1. Split-Half Method — Odd and Even Numbers	0.95	0.010
2. Kuder Richardson Formula	0.93	0.015
Validity		
1. Achievement Scores & School Marks	0.46	0.079
2. Achievement Scores & I. Q.	0.48	0.08

TABLE 4.3

RELIABILITY AND VALIDITY OF ARITHMETIC TEST

	r	SEr
Reliability		
1. Split-Half Method — Odd and Even Numbers	0.76	0.63
2. Kuder-Richardson Formula	0.93	0.014
Validity		
1. Achievement Scores and School Marks	0.78	0.038
2. Achievement Scores and I. Q.	0.38	0.086

TABLE 4.4

RELIABILITY AND VALIDITY OF SCIENCE TEST

	r	SEr
Reliability		
1. Split-Half Method — Odd and Even Numbers	0.75	0.039
2. Kuder-Richardson Formula	0.90	0.018
Validity		
1. Achievement Scores and School Marks	0.70	0.011
2. Achievement Scores & I. Q.	0.40	0.061
3. Achievement Scores & Scores on test of Arithmetic	0.54	0.071

TABLE 4.5

RELIABILITY OF THE PERSONALITY RATING SCALE

Test-retest method N = 50	r = .65	SEr = .067

RESULTS

The tests described above were administered to the subjects of this investigation and their scores obtained. Means and SDs of the group with kindergarten education and of the group without it were calculated for each school. The difference between the two means in each school was tested for significance by *t* test. As intelligence and achievement are correlated, the coefficient of correlation between intelligence and each of the four achievement tests were first determined and the following formula was used for determining the Standard Error of the Difference between the Means.

$$SE_{D_m} = \sqrt{\sigma^2_{M1} + \sigma^2_{M2} - 2r_{12}\sigma_{M1} \cdot \sigma_{M2}}$$

For testing the significance of the difference between the means of scores on the handwriting scale and personality rating scale, the following simple formula was used, as they have very little correlation with intelligence.

$$SE_{D_m} = \sqrt{\sigma^2_{M1} + \sigma^2_{M2}}$$

The following tables show the scores of individual pupils of the two groups in each school on the achievement tests, handwriting scale and personality rating scale. The means, standard are also shown at the bottom of the tables. The last table. sumdeviations, difference between the means and their significance marises the results.

TABLE 5.1

COMPARISON OF SCORES ON THE LANGUAGE TEST

SCHOOL : NV

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	39	1	47
2	37	2	40
3	50	3	33
4	47	4	40
5	32	5	34
6	43	6	40
7	44	7	38
8	28	8	46
9	41	9	35
10	37	10	21
11	37	11	38
12	26	12	32
13	41	13	24
14	40	14	41
15	34	15	35
Mean =	38.4	Mean =	36.2
SD =	6.36	SD =	6.35

Difference between two Means = 2.2
Not Significant

TABLE 5.2

COMPARISON OF SCORES ON THE LANGUAGE TEST

SCHOOL : NPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	32	1	38
2	34	2	29
3	36	3	35
4	38	4	40
5	42	5	32
6	36	6	31
7	23	7	19
8	24	8	24
9	41	9	17
10	28	10	29
Mean = 33.4		Mean = 29.9	
SD = 7.0		SD = 7.085	

Difference between two Means = 3.5

Not Significant

TABLE 5.3

COMPARISON OF SCORES ON THE LANGUAGE TEST
SCHOOL : UKM

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	45	1	47
2	39	2	47
3	40	3	46
4	44	4	40
5	30	5	36
6	43	6	41
7	37	7	36
8	43	8	34
9	28	9	43
10	39	10	40
11	33	11	35
12	33	12	33
13	38	13	41
Mean =	37.8	Mean =	36.8
SD =	3.46	SD =	4.69

Difference between two Means : 1.0
Not Significant

TABLE 5.4

COMPARISON OF SCORES ON THE LANGUAGE TEST
SCHOOL : SKS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	37	1	38
2	40	2	40
3	40	3	43
4	38	4	33
5	28	5	33
6	39	6	28
7	36	7	30
8	31	8	45
9	35	9	43
10	35	10	28
11	40	11	38
12	36	12	33
13	37	13	25
14	25	14	32
15	34	15	23
Mean = 35.4		Mean = 34.1	
SD = 4.29		SD = 6.57	

Difference between two Means : 1.3
Not Significant

TABLE 5.5

COMPARISON OF SCORES ON THE LANGUAGE TEST

SCHOOL : DBPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	45	1	50
2	45	2	45
3	44	3	41
4	39	4	40
5	40	5	46
6	34	6	25
7	38	7	38
8	43	8	38
9	36	9	41
10	47	10	32
11	44	11	36
12	42	12	37
13	40	13	33
14	24	14	23
Mean = 40.4		Mean = 36.0	
SD = 5.66		SD = 7.65	
Difference between two Means : 4.4			
Significance level : 01			

TABLE 5.6

COMPARISON OF SCORES ON THE LANGUAGE TEST
SCHOOL : HKES

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	47	1	42
2	45	2	46
3	39	3	45
4	47	4	48
5	47	5	35
6	40	6	45
7	40	7	27
8	39	8	42
9	25	9	42
10	42	10	45
11	39	11	30
12	30	12	40
13	25	13	30
14	43	14	35
15	40	15	18
16	42	16	19
17	40	17	22
18	35	18	30
19	40	19	20
20	39	20	42
21	20	21	25
22	18	22	19
23	20	23	30
24	40	24	41
25	25	25	20
Mean = 36.28		Mean = 33.52	
SD = 8.79		SD = 9.94	

Difference between two Means : 2.76
Not Significant

TABLE 6.1

COMPARISON OF SCORES ON SOCIAL STUDIES TEST
SCHOOL : NV

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	38	1	40
2	30	2	35
3	35	3	29
4	32	4	25
5	24	5	12
6	29	6	32
7	36	7	26
8	3	8	37
9	25	9	12
10	40	10	19
11	31	11	18
12	32	12	19
13	20	13	16
14	15	14	21
15	7	15	16
Mean = 27.86		Mean = 23.80	
SD = 11.03		SD = 8.18	

Difference between two Means : 4.06
Significance level : 0.05

TABLE 6.2

COMPARISON OF SCORES ON SOCIAL STUDIES TEST
SCHOOL : NPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	7	1	12
2	8	2	25
3	7	3	19
4	20	4	19
5	26	5	22
6	11	6	7
7	16	7	3
8	3	8	17
9	22	9	1
10	1	10	3
Mean =	12.1	Mean =	12.6
SD =	8.0	SD =	8.32

Difference between two Means : 0.5
Not Significant

TABLE 6.3

COMPARISON OF SCORES ON SOCIAL STUDIES TEST

SCHOOL : UKM

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	36	1	44
2	30	2	40
3	30	3	39
4	31	4	29
5	16	5	25
6	36	6	33
7	33	7	31
8	36	8	27
9	18	9	33
10	32	10	19
11	28	11	19
12	10	12	4
13	27	13	25
Mean = 27.7		Mean = 28.3	
SD = 7.93		SD = 10.0	

Difference between two Means : 0.6
Not Significant

TABLE 6 4

COMPARISON OF SCORES ON SOCIAL STUDIES TEST
SCHOOL : SKS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	20	1	14
2	15	2	19
3	24	3	30
4	5	4	1
5	17	5	11
6	9	6	3
7	3	7	10
8	10	8	11
9	13	9	8
10	8	10	8
11	11	11	8
12	15	12	10
13	5	13	7
14	3	14	7
15	7	15	2
Mean = 11.0		Mean = 10.62	
SD = 6.3		SD = 7.0	

Difference between two Means : .38
Not Significant

TABLE 6.5

COMPARISON OF SCORES ON SOCIAL STUDIES TEST
SCHOOL :DBPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	25	1	38
2	36	2	41
3	27	3	17
4	26	4	19
5	28	5	22
6	9	6	20
7	31	7	16
8	35	8	16
9	24	9	15
10	22	10	26
11	17	11	19
12	20	12	1
13	23	13	12
14	2	14	8
Mean = 22.0		Mean = 20.56	
SD = 9.50		SD = 10.2-	

Difference between two Means : 1.44
Not Significant

TABLE 6.6

COMPARISON OF SCORES ON SOCIAL STUDIES TEST
SCHOOL : HKES

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	26	1	30
2	20	2	31
3	22	3	37
4	25	4	34
5	25	5	28
6	20	6	20
7	9	7	17
8	23	8	24
9	25	9	14
10	8	10	39
11	12	11	19
12	23	12	30
13	9	13	10
14	33	14	20
15	25	15	9
16	25	16	12
17	30	17	9
18	10	18	18
19	10	19	20
20	9	20	8
21	15	21	9
22	9	22	12
23	19	23	6
24	22	24	10
25	8	25	11
Mean = 19.2		Mean = 19.0	
SD = 7.14		SD = 7.76	

Difference between two Means : 0.2
Not Significant

TABLE 7.1

COMPARISON OF SCORES ON ARITHMETIC TEST

SCHOOL : NV

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	33	1	34
2	28	2	22
3	32	3	16
4	18	4	25
5	20	5	21
6	28	6	29
7	31	7	14
8	27	8	25
9	14	9	29
10	18	10	14
11	23	11	17
12	23	12	20
13	15	13	23
14	16	14	10
15	13	15	20
Mean = 22.6		Mean = 21.25	
SD = 6.64		SD = 6.29	

Difference between two Means : 1.35

Not Significant

TABLE 7.2

COMPARISON OF SCORES ON ARITHMETIC TEST
SCHOOL : NPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	9	1	15
2	20	2	19
3	12	3	15
4	18	4	8
5	19	5	15
6	5	6	17
7	7	7	8
8	2	8	15
9	3	9	10
10	3	10	9
Mean = 10.8		Mean = 13.1	
SD = 6.8		SD = 3.8	

Difference between two Means : 2.3
Not Significant

TABLE 7.3

COMPARISON OF SCORES ON ARITHMETIC TEST
SCHOOL : UKM

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	29	1	33
2	14	2	22
3	8	3	24
4	20	4	13
5	13	5	17
6	18	6	30
7	22	7	26
8	24	8	8
9	6	9	11
10	5	10	12
11	10	11	8
12	8	12	10
13	12	13	9
Mean = 13.3		Mean = 17.1	
SD = 7.36		SD = 8.01	

Difference between the Means : 3.8
Not Significant

TABLE 7.4

COMPARISON OF SCORES ON ARITHMETIC TEST
SCHOOL : SKS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	26	1	19
2	25	2	18
3	17	3	12
4	13	4	14
5	1	5	5
6	9	6	12
7	9	7	13
8	8	8	12
9	28	9	10
10	9	10	17
11	12	11	12
12	15	12	9
13	6	13	5
14	2	14	7
15	5	15	6
Mean = 12.3		Mean = 11.4	
SD = 8.18		SD = 3.93	

Difference between the Means : 0.9
Not Significant

TABLE 7.5

COMPARISON OF SCORES ON ARITHMETIC TEST
SCHOOL : DBPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	30	1	21
2	34	2	29
3	18	3	8
4	20	4	16
5	18	5	8
6	16	6	28
7	14	7	19
8	29	8	11
9	14	9	17
10	17	10	17
11	20	11	16
12	6	12	12
13	14	13	8
14	22	14	18
Mean = 19.2		Mean = 16.2	
SD = 9.77		SD = 6.25	

Difference between the Means : 3.0
Not Significant

TABLE 7.6

COMPARISON OF SCORES ON ARITHMETIC TEST
SCHOOL : HKES

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	26	1	33
2	33	2	20
3	17	3	21
4	29	4	37
5	29	5	22
6	16	6	29
7	20	7	21
8	19	8	26
9	20	9	13
10	17	10	34
11	11	11	11
12	21	12	27
13	23	13	22
14	25	14	16
15	19	15	8
16	32	16	12
17	16	17	19
18	21	18	5
19	4	19	16
20	13	20	21
21	18	21	12
22	22	22	19
23	19	23	19
24	27	24	6
25	9	25	10
Mean = 20.2		Mean = 18.2	
SD = 6.82		SD = 8.49	

Difference between the Means : 2.0
Not Significant

TABLE 8.1

COMPARISON OF SCORES ON SCIENCE TEST

SCHOOL : NV

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	23	1	22
2	13	2	19
3	17	3	15
4	18	4	17
5	18	5	15
6	18	6	22
7	22	7	11
8	20	8	18
9	20	9	15
10	25	10	12
11	20	11	13
12	21	12	13
13	22	13	16
14	15	14	13
15	18	15	18
Mean = 20.0		Mean = 16.0	
SD = 3.076		SD = 3.27	

Difference between the Means : 4.0

Significance level : .01

TABLE 8.2

COMPARISON OF SCORES ON SCIENCE TEST
SCHOOL : NPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	5	1	14
2	18	2	16
3	9	3	8
4	15	4	14
5	20	5	11
6	16	6	11
7	11	7	9
8	5	8	12
9	14	9	5
10	4	10	10
Mean =	11.7	Mean =	11.0
SD =	5.47	SD =	3.09

Difference between the Means : 0.7
Not Significant

TABLE 8.3

COMPARISON OF SCORES ON SCIENCE TEST

SCHOOL : UKM

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	22	1	23
2	16	2	14
3	11	3	17
4	11	4	10
5	4	5	12
6	11	6	9
7	11	7	13
8	19	8	5
9	8	9	14
10	8	10	15
11	8	11	7
12	5	12	8
13	9	13	10
Mean =	11.0	Mean =	12.2
SD =	5.38	SD =	4.55

Difference between the Means : 1.2

Not Significant

TABLE 8.4

COMPARISON OF SCORES ON SCIENCE TEST

SCHOOL : SKS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	11	1	18
2	1	2	8
3	13	3	13
4	11	4	5
5	10	5	7
6	11	6	3
7	12	7	4
8	13	8	9
9	16	9	9
10	8	10	10
11	10	11	7
12	14	12	9
13	6	13	3
14	2	14	2
15	4	15	2
Mean = 9.4		Mean = 7.13	
SD = 4.29		SD = 4.26	

Difference between the Means : 2.27

Not Significant

TABLE 8.5

COMPARISON OF SCORES ON SCIENCE TEST
SCHOOL : DBPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	13	1	18
2	16	2	30
3	20	3	16
4	16	4	4
5	13	5	18
6	16	6	17
7	17	7	15
8	16	8	16
9	12	9	13
10	16	10	15
11	9	11	14
12	9	12	5
13	21	13	14
14	21	14	13
Mean =	14.85	Mean =	14.8
SD =	4.0	SD =	5.84

Difference between the Means : .05
Not Significant

TABLE 8.6

COMPARISON OF SCORES ON SCIENCE TEST
SCHOOL : HKES

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	14	1	15
2	16	2	16
3	14	3	21
4	20	4	16
5	19	5	10
6	21	6	22
7	13	7	17
8	16	8	17
9	25	9	11
10	12	10	24
11	18	11	14
12	22	12	13
13	10	13	17
14	15	14	15
15	14	15	9
16	12	16	7
17	15	17	6
18	9	18	10
19	9	19	15
20	15	20	26
21	17	21	7
22	11	22	7
23	6	23	10
24	17	24	14
25	8	25	13
Mean = 14.70		Mean = 14.08	
SD = 4.5		SD = 5.44	

Difference between the Means : 0.62
Not Significant

TABLE 9.1

COMPARISON OF SCORES ON HANDWRITING SCALE
SCHOOL: NV

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	11	1	10
2	13	2	13
3	14	3	14
4	11	4	12
5	11	5	11
6	12	6	10
7	11	7	11
8	9	8	13
9	13	9	13
10	10	10	11
11	11	11	12
12	13	12	10
13	12	13	11
14	12	14	14
15	13	15	14
Mean = 11.6		Mean = 11.9	
SD = 1.41		SD = 1.3	

Difference between the Means : .3

Not Significant

TABLE 9.2

COMPARISON OF SCORES ON HANDWRITING SCALE
SCHOOL : NPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	13	1	13
2	15	2	12
3	13	3	12
4	11	4	10
5	11	5	14
6	13	6	13
7	12	7	10
8	12	8	13
9	13	9	9
10	12	10	14
Mean =	12.5	Mean =	12.0
SD =	1.2	SD =	1.2

Difference between the Means : 0.5

Not Significant

TABLE 9.3

COMPARISON OF SCORES ON HANDWRITING SCALE

SCHOOL : UKM

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	13	1	14
2	14	2	12
3	12	3	15
4	12	4	12
5	13	5	13
6	15	6	16
7	11	7	10
8	11	8	12.
9	11	9	11
10	12	10	12
11	10	11	13
12	12	12	12
13	10	13	14
Mean = 12.0		Mean = 12.8	
SD = 1.4		SD = 1.1	

Difference between the Means : 0.8

Not Significant

TABLE 9.4

COMPARISON OF SCORES ON HANDWRITING SCALE
SCHOOL : SKS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	12	1	9
2	12	2	14
3	13	3	11
4	12	4	12
5	11	5	12
6	11	6	12
7	9	7	10
8	15	8	13
9	10	9	12
10	12	10	11
11	9	11	13
12	12	12	11
13	11	13	10
14	9	14	10
15	12	15	9
Mean =	11.3	Mean =	11.2
SD =	1.1	SD =	1.6

Difference between the Means : 0.1
Not Significant

TABLE 9.5

COMPARISON OF SCORES ON HANDWRITING SCALE
SCHOOL : DBPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	13	1	14
2	14	2	13
3	14	3	12
4	10	4	13
5	10	5	14
6	13	6	12
7	11	7	13
8	11	8	13
9	12	9	13
10	12	10	13
11	11	11	11
12	13	12	13
13	11	13	14
14	13	14	13
Mean =	12.1	Mean =	13.1
SD =	1.4	SD =	0.6

Difference between the Means : 1.00
Not Significant

TABLE 9.6

COMPARISON OF SCORES ON HANDWRITING SCALE
SCHOOL : HKES

Group A (with K.G.)		Group B (without K.G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	12	1	14
2	10	2	14
3	11	3	12
4	11	4	16
5	11	5	10
6	9	6	13
7	10	7	11
8	14	8	13
9	12	9	13
10	11	10	11
11	13	11	13
12	10	12	16
13	12	13	10
14	11	14	11
15	12	15	12
16	12	16	11
17	10	17	15
18	11	18	10
19	13	19	11
20	14	20	16
21	14	21	10
22	11	22	12
23	11	23	11
24	11	24	13
25	14	25	13
Mean = 11.6		Mean = 12.4	
SD = 1.41		SD = 1.4	

Difference between the Means : 0.8
Not Significant

TABLE 10.1

COMPARISON OF SCORES ON PERSONALITY RATING SCALE-
SCHOOL : NV

Group A (with K. G.)		Group B (without K.G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	89	1	105
2	90	2	103
3	89	3	92
4	75	4	76
5	72	5	92
6	90	6	102
7	96	7	87
8	72	8	83
9	82	9	83
10	83	10	84
11	92	11	73
12	73	12	85
13	95	13	69
14	86	14	74
15	71	15	74
Mean = 83.6		Mean = 85.7	
SD = 8.66		SD = 11.0	

Difference between the Means : 2.1

Not Significant

TABLE 10.2

COMPARISON OF SCORES ON PERSONALITY RATING SCALE
SCHOOL : NPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	87	1	84
2	90	2	86
3	111	3	92
4	107	4	53
5	97	5	76
6	108	6	65
7	81	7	43
8	65	8	43
9	88	9	57
10	79	10	52
Mean = 91.3		Mean = 69.9	
SD = 13.89		SD = 18.0	

Difference between the Means : 21.4
Significance level : 0.02

TABLE 10.3

COMPARISON OF SCORES ON PERSONALITY RATING SCALE
SCHOOL : UKM

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	89	1	115
2	83	2	112
3	68	3	122
4	113	4	111
5	91	5	90
6	95	6	107
7	71	7	104
8	78	8	88
9	92	9	95
10	96	10	113
11	94	11	86
12	72	12	80
13	81	13	88
Mean = 86.3		Mean = 100.8	
SD = 12.2		SD = 13.0	

Difference between the Means : 14.5
Significance level : 0.01

TABLE 10.4

COMPARISON OF SCORES ON PERSONALITY RATING SCALE
SCHOOL : SKS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	110	1	120
2	106	2	124
3	110	3	113
4	97	4	99
5	71	5	103
6	109	6	93
7	92	7	93
8	111	8	105
9	106	9	121
10	105	10	100
11	120	11	86
12	102	12	60
13	72	13	49
14	91	14	96
15	114	15	64
Mean =	101.0	Mean =	95.0
SD =	13.8	SD =	25.88

Difference between the Means : 6.0

Not Significant

TABLE 10.5

COMPARISON OF SCORES ON PERSONALITY RATING SCALE
SCHOOL : DBPS

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	96	1	127
2	114	2	95
3	111	3	95
4	85	4	49
5	97	5	100
6	109	6	78
7	107	7	111
8	101	8	88
9	72	9	94
10	113	10	85
11	93	11	37
12	80	12	50
13	102	13	50
14	84	14	69
15	62	15	67
Mean = 95.0		Mean = 79.6	
SD = 14.93		SD = 23.7	

Difference between the Means : 15.4
Significance level : 0.02

TABLE 10.6

COMPARISON OF SCORES ON PERSONALITY RATING SCALE
SCHOOL : HKES

Group A (with K. G.)		Group B (without K. G.)	
Sr. No. of Pupil	Scores	Sr. No. of Pupil	Scores
1	88	1	114
2	81	2	101
3	91	3	100
4	66	4	109
5	93	5	76
6	70	6	99
7	45	7	79
8	95	8	73
9	84	9	80
10	73	10	116
11	77	11	72
12	81	12	102
13	61	13	62
14	73	14	80
15	76	15	49
16	86	16	73
17	63	17	71
18	73	18	66
19	60	19	74
20	91	20	86
21	56	21	63
22	50	22	62
23	82	23	41
24	106	24	67
25	57	25	55
Mean = 79.0		Mean = 78.8	
SD = 13.5		SD = 16.5	

Difference between the Means : 0.2
Not Significant

TABLE 11

SUMMARY OF RESULTS

No. of equivalent groups	Subject on which compared	No. of significant D_m		No. of non-significant D
		At 05 level	At .01 level	
6	Language		1	5
6	Social Studies	1		5
6	Arithmetic			6
6	Science		1	5
6	Handwriting			6
6	Personality Traits	2	1	3

SUMMARY OF RESULTS

Table 11 summarises the results obtained.

1. There were six pairs of equivalent groups in this investigation and they were compared on achievement in four subjects. Thus there were twenty-four results. Out of these twenty-four, only three differences in mean scores have been found to be significant either at .05 or .01 level.

2. None of the six schools showed a significant difference between the handwriting of the two groups.

3. In the case of the personality traits for which the rating scale was prepared, three schools showed a significant difference between the two groups and three did not show a significant difference. In two schools, the pupils with kindergarten education are found to be better on the rating scale, while in one school, those without kindergarten education are found to be better. Thus on the whole the evidence is inconclusive.

CONCLUSION

The evidence collected in this investigation tends to uphold the hypothesis with which it was begun.

It is therefore concluded that the levels of achievement in academic subjects and of developmental tasks to be learnt in primary school, of pupils who have attended a kindergarten school for two years are *no better than* those of pupils who have not attended a kindergarten school before joining the primary school.

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