The Hashemite Kingdom of Jordan

National Center for Human Resources Development (NCHRD)

Assessment Of Learning Achievement Of Grade 4 Students In Oman : Final Repot

By

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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

BACKGROUND

Realizing the role of education in social and economic development, the Sultanate of Oman has formulated and implemented policies to increase access to and improve the quality of education. The high priority given to education led to an increase in student enrollment ratios in general education. In 1990 gross primary school enrollment ratio reached 90%, preparatory enrollement reached 50%, and secondary enrollment ratio reached 20%.

Following the Jomtien Declaration on Education-For-All, the Sultanate of Oman, as most countries, has demonstrated a firm commitment to reach its goals in providing access to primary education for all school-age children, and meeting basic learning needs. This was also reflected in serious attempts to improve the quality of education.

Working toward achieving Education-For-All goals and improving quality of basic education, the Ministry of Education has decided to participate in the "Monitoring Education-For-All Goals" Project initiated by UNESCO and UNICEF.

The project was implemented by the Ministry of Education with technical assistance from the National Center for Human Resources Development in Jordan and funds from UNICEF and UNESCO.

This report describes the broad objectives, design, instruments and results about performance of grade four Omani Students on Arabic Language Test, Science Test, Mathematics Test and Life Skills. Detailed results about variation in performance due to many variables and description of contextual factors in relation to student achievement are also described.

METHODOLOGY OF THE PROJECT

The overall methodology of the project is characterized by being simple, workable and sustainable. The ideal population for the monitoring learning achievement survey constitutes of all the primary school students in the Sultanate of Oman. The defined population, however, constituted of all grade four students in the mainstream schools.

Sample

After considering the key operating factors including simplicity, representativeness, practicability, affordability and cost-effectiveness, it was agreed that a stratified proportionate random sample of 68 schools would be adequate to provide desirable accuracy of estimates of the parameters of interests.

A proportionate sample of schools was selected (10% from each cell: Region X gender of school) from the sampling frame from the stratum defined in each educational region. Following this procedure, a total number of 68 schools were selected. 3 other schools were also added to the sample representing private schools from Muscat region.

Instruments

Four achievement tests were developed to assess learning achievement in the following four primary school subjects: Arabic Language, Science, Mathematics, and Life Skills. These tests were developed in accordance with standard procedures for achievement tests' construction. Because learning does not occur in a vacuum, it was decided to collect information on a number of contextual variables which have an impact on teaching learning processes. These variables include students' home environment, family background, instructional practices, teacher characteristics, administrative practices and other school variables, students' attitudes toward themselves and their schools. All these factors were assessed by four carefully designed, developed and field-tested self-report instruments, namely: (1) Parent Questionnaire, (2) Principal Questionnaire, (3) Teacher Questionnaire, and (4) Student Questionnaire.

Data Collection

To ensure reasonably accurate and generalizable information capable of generating sufficiently valid conclusions, a team of regional coordinators and a team of 71 test administrators was trained and charged with the responsibility of the test administration and data collection. Field work was supervised by the Omani National Task Force to ensure uniform standards of test administration. Data was collected during the last week of April 1994.

Analysing the Data: Due to diversified nature of variables and target populations a two-stage data analysis and interpretation strategy was developed. The statistical procedures applied at this stage included frequency analysis, decomposition of ramified variables and scales, interitem correlations, scale and subscale reliability indices, distributional properties of various types of scale and subscale scores, descriptive statistics and variance analyses.

The purpose of the first set of analyses was to establish the reliability and other properties of interest of each instrument, while that of the descriptive and variation analyses was to establish the current standards of achievement and current norms of certain practices at the national, regional, education authority, student gender, and location (rural/urban) levels, as well as to study the differences in the performance of students in different groups of schools defined by the preceding set of exogenous factors.

The second-stage analyses involved deriving indicator indices and parsimonious sets of latent concepts in the major domains of variables and studying relationships between student achievement and important family background, parental, community, school and classroom factors. This analysis involved also searching for explanatory statistical models using Multiple Regression.

MAJOR FINDINGS

This study on fourth grade levels of achievement and factors (students, parents, teachers, and principals) affecting their achievement in the Sultanate of Oman revealed the following results:

- The national average percent correct was 57 on the Arabic Language Test, 54 on the Math Test, 49 on the Science Test, and 48% on the Life Skills Test. National average includes the three private schools from Muscat.

- Only 17% of the sampled students scored higher than 80% correct (mastery level) on the Arabic Test, 8% on the Math Test, 6% on the Science Test, and only 3% on the Life Skills.

- 39%, 39%, 58%, and 53% of students scored below 50 percent correct on the Arabic, Math, and Science Tests and Life Skills, respectively.

- The Multiple comparisons among different regions were computed for MOE schools only, i.e., private schools had been excluded from the computations. Dhofar, South Sharqiya, and Al-Dakhiliya students performed better than South Batina and North Batinah students in Math while there were no significant differences between other pairs of regions.

- On the Science test both Al-Dahira and Al-Dakiliya performed significantly better than Al-Batina and Al-Sharqiya; Muskat and Dhofar performed better than Al-Batina; while there were no significant differences among other regions.

- On the Arabic test Dhofar scored significantly higher than Al-Sharqiya, Al-Batina South, Al-Batina North, and Muscat; and Al-Dahira scored significantly higher than Al-Sharqiya, Al-Batina South

and Al-Batina North. There were no significant differences between pairs of other regions.

- On Life Skills test, Al-Sharqiya South students performed statistically significantly better than did the students of Al-Sharqiya North, Al-Batina North and Al-Batina South; students of Al-Dhofar, Al-Dahira, and Al-Dakhiliya scored significantly better than those of Al-Sharqiya North and Al-Batina North; Whereas Muscat students did significantly better than Al-Sharqiya students. There were no significant differences among other pairs of regions.

- On the Arabic Language Test, the highest performance was on the reading subscale and the lowest was on items measuring composition skills. In Math, the highest performance was on Numbers subscale and the lowest was on the Measurement subscale. In Science, the highest performance was on the Universe subscale and the lowest was on the Living Creatures subscale. Finally, in Life Skills, the highest performance was on the Daily Behavior subscale and the lowest was on Civic (National) Education subscale.

- On the basis of the total score, on both Arabic Language and Life Skills tests, female students performed significantly higher than male students (the difference was on the average 5%). No gender differences, however, were found on the total scores of Math and Science tests. Never-the-less, gender differences were observed on some subscales. On Human subscale in Science, girls outscored the boys. In mathematics also girls outperformed the boys on Numbers and Fractions while boys did better on Measurement.

- On all the four tests, private school students scored significantly higher (on the average 13% difference) than public school students.

- On both Arabic Language and Science Tests, urban school students scored higher (4% difference) than rural school students.

- Among parental factors, socio-economic status and family academic aspirations for the child appeared to be the most significant contributors to the variation in students' scores on Arabic Language, Math and Science Tests. These two factors correlate positively with achievement in the three subjects.

- Students' external attribution style of academic success (luck, task difficulty) and internal attribution of failure to internal factors (lack of interest) emerged to be the most significant predictors of academic achievement from all other student-related factors in the three subjects (Arabic, Math, and Science). In other words, students who tend to attribute their success to external factors and/or their failure to internal factors achieved significantly lower than those who attribute their success to internal factors. Perceived teacher competency (clarity of instruction, acceptance of students) also

affected students' achievement in the three subjects (Arabic Language, Math and Science).

- Teachers' high level of expectation for students' academic motivation appeared to be the most significant contributor to the variation in students' scores in the three subjects. Other teacher-related variables such as full-time work load, home-school cooperation, and utilization of instructional aids also contributed significantly to the variation in students' scores.

- School factors such as availability of facilities and services (electricity, water...) and the degree to which schools involve parents in school activities appeared to affect (positively) students' achievement. Other school variables such as lack of financial resources, number of teachers transferred to other schools annually, and number of other employees in the school appear to affect (negatively) students' achievement.

Policy Recommendations

The findings reported here suggest that the conditions that make a significant difference to students' achievement are the students' background, particularly socio-economic status, family aspirations for the child, follow-up of students' school work, students' interest in school, inclination toward reading books, students' attribution to success and failure, students' perceptions of their teachers (clarity of instruction and realistic expectations), teachers' expectations of students' ability and motivation to learn, availability of facilities in schools and parental involvement in school activities. The findings also suggest that schools differ substantially in their academic achievement in Arabic Language, mathematics and science. It makes a difference what school a child attends (private vs. public, urban vs. rural, fully vs. partially equipped). However, the specific aspects of school practice that make some schools more effective than others were difficult to discern. The findings suggest that teachers' qualifications level, participation in in-service training programs, teaching style & methods, and the background and activities of principals make no difference to student achievement.

These findings have several policy implications for the Ministry of Education in Oman:

1. The study provides good baseline data on students' levels of achievement, teaching practices, administrative practices and home-related factors. The data can be used to provide strategic feedback on the reform activities and measures currently being implemented in Oman. The data will enable researchers to estimate changes in school performance over time and to determine whether changes in performances are related to changes in school (system) policy and practice.

2. The findings clearly indicate the importance of renewed efforts, within the framework of the national educational reform, to improve the quality of primary school teaching/learning processes, given the rather low student achievement levels in all subjects covered in the project.

3. The Ministry of Education should conduct a careful evaluation of the impact of its in-service training and certification programs for teachers and principals. The most critical question is whether this program is leading to changes in teaching methods. If teachers and principals come out of those programs with a certificate but teach and manage schools much the same as they did before they entered, the present system of training and certification might be abolished because it is making no difference for education.

4. In-service teacher-training programs should include other components related to teachers' knowledge and beliefs about student success and failure. Training programs should not be directed only to fine-tuning of teaching practice but should also include strategies to challenge teachers' beliefs, perceptions about their students' success or failure. Results showed that teachers tend to attribute students success and failure to external factors (student ability, parental follow-up) rather than to their own good or bad teaching. This would unconsciously force teachers not to extend any effort to bring about desirable changes in students' learning.

5. Primary school principals in Oman seem to work more as administrators than as instructional leaders. This is a situation that is common in many countries. Experience in other ..... (Those and for example) shows that principals can be taught to mobilise teachers into better performance. If that is to happen, however, all those involved in operating schools must have the same perspective. If principals alone are trained in leadership, their initiatives can easily be undercut by supervisors or teachers who do not believe they have any right to be leaders rather than administrators.

6. Results indicate a clear need to address regional, rural/urban, socio-economic, and public/private disparities in educational quality and attainment.

7. Given the apparent importance of family background and attitudes and children's out of school activities (reading activities in particular), it is crucial to draw parents and community more fully into the educational process as a whole (through parent-teacher associations..etc).

8. Results present an opportunity to seize the link uncovered between parents' (especially mothers') educational level and students' achievement levels, for advocacy purposes, stressing the importance

of girls' education to higher levels in the interests of their roles as future mothers.

9. The importance of institutionalizing national processes of educational monitoring and evaluation, and in the context of Oman, linking these to the national educational reform program. The assessment program could be extended to cover other grades and subjects matters.

10. There is a need for more qualitative studies and assessment of contextual factors on student achievements. New surveys of schools should use interviews and observations to collect data on certain aspects of school life (classroom teaching practices for example).

BACKGROUND

Since 1970, the Government of Oman, realizing the role of education in social and economic development, has formulated and implemented policies to increase access to and improve the quality of education. The high priority given to education led to an increase in student enrolment ratios in general education. In 1990 gross primary school enrolment ratio reached 90%, preparatory enrolment reached 50%, and secondary enrolment reached 20%. This expansion was accompanied by increased allocation of financial resources to the development of human resources.

Following the Jomtien Declaration on Education-For-All, the Sultanate of Oman, as most countries, has demonstrated a firm commitment to reach its goals in providing access to primary education for all school-age children, and meeting basic learning needs. This was also reflected in serious attempts to improve the quality of education.

Working toward achieving Education-For-All goals and improving quality of basic education, the Ministry of Education decided to participate in the "Monitoring Education-For-All Goals" Project initiated by UNESCO and UNICEF. The project aims at assisting countries to develop national systems for monitoring and assessment of learning achievements of 4th grade students in order to monitor the learning achievement goals of Education-For-All.

The Monitoring Project focuses on primary education as a corner stone in any Education-For-All strategy. It is designed to develop a set of measurable and internationally accepted indicators which can be used to monitor progress towards Education For-All and to detect shortcomings. The project is in line with strategies set out in the World Declaration on Education-For-All which were adopted by the World Conference on Education-For-All held in Jomtien, Thailand in 1990. The project focuses on the learning achievements of primary school children at the 4th grade level in literacy, numeracy, and life skills.

Oman is one of the second batch of countries that have participated in this monitoring assessment which reflects its strong commitment to improving quality of education and in meeting Education-For-All Goals.

The project was implemented by the Ministry of Education with technical assistance from the National Center for Human Resources Development (NCHRD) in Jordan and funds from UNICEF and UNESCO.

This report describes the broad objectives, design, instruments and results of performance of grade four Omani students on the Arabic Language, Science, Mathematics and Life Skills tests. Detailed results of variation in performance due to many variables and description of contextual factors in relation to student achievement are also described.

OBJECTIVES OF THE PROJECT

The main focus of this project is on measurement of the achievement levels of primary school students. The project is designed to develop a set of measurable indicators about achievement learning within school and home contexts which can be used to monitor progress towards Education-For-All and detect shortcomings.

The objectives of this project fall into two broad categories: (A) Direct (Immediate), and; (B) Indirect (Distant).

Direct (Short-Tem) Objectives
Short-term objectives include:

1. Measuring learning achievement of students at the end of the 4th year of basic education in the following key subjects:
   - Arabic Language (Literacy);
   - Mathematics (Numeracy);
   - Science, and
   - Life skills.

2. Studying students' family backgrounds, parental practices, perceptions, expectations, and attitudes related to schools, and their children's performance.

3. Studying teachers' instructional practices, attitudes, beliefs, perceptions, knowledge, expectations, and background characteristics.

4. Studying school-related characteristics and principals' administrative practices, beliefs and attitudes.

5. Studying students' attitudes, beliefs, perceptions of schools, teachers, classroom practices and of themselves.

6. Studying the relationships between, on the one hard, various home background, community, school, teacher, classroom, and, on the other hand, student factors and student achievements.

7. Developing a set of indicators about levels of students' performance across different regions, gender, and rural/urban environments.

8. Identifying strengths and weaknesses of the education system, deriving policy implications and suggestions for improvement.

Long-Term Objectives:
The long-term objectives include:

1. Building up national capacity for monitoring educational progress and assessment of student achievement.

2. Institutionalizing the evaluation function by establishing a mechanism for monitoring learning achievements periodically.

3. Establishing a channel of communication and promoting dialogue between evaluation research and educational planning in order to formulate informed policy and effective plans of action geared toward Education-For-All Goals and improvement of educational quality.

Research Questions:
This report addresses the following research questions:

1. What are the levels of achievement in Arabic Language, Math, Science and Life Skills of grade 4 students? Are there any significant differences in levels of achievement that can be

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attributed to student gender, location of school (rural or urban), educational region, and educational authority?

2.   Which parent, student, teacher, and school or principal factors contribute significantly to the variation in students or schools scores in Arabic Language, Math and Science achievement?

METHODOLOGY OF THE PROJECT

The overall methodology of the project is characterized as being simple, workable and sustainable. The ideal population for the monitoring learning achievement survey would include all primary school students in the Sultanate of Oman. The defined population, however, consisted of all grade four students in the mainstream schools, as well as in the three private schools regardless of their nationality.

Sample Frame:

Since the project is targeted toward grade four students at this stage, only schools that have grade four classes were included in the sample frame. As of the school year 1993/1994 there were 899 public schools in the Sultanate of Oman. Out of these, only 658 schools have grade four classes. That is, the schools (operating in the mainstream of education system) that do not have grade 4 classes were excluded from the defined target population of schools. Thus, the remaining schools from which the sample wasselected were 658 with 44,409 students. The educational database about schools (1993/1994) maintains comprehensive census data collected annually from all the schools in the Sultanate of Oman. This considerably facilitated the sample selection procedures and virtually guaranteed the accuracy and integrity of the sampling frame.

In the education and health sectors, Oman is divided administratively into 10 regions which vary in terms of number of schools and students. To maintain the representativeness of important factors and characteristics such as region and gender of the school, a stratified sampling approach was used to select the sample of this monitoring project.

Table (1) presents the breakdown of schools comprising the fourth class across the ten regions by the type of the school (male or female) based on 93-94 scholastic year data of the Ministry of Education. Table (2) shows the distribution of grade 4 students enrolled in those schools.

Table 1
Distribution of Schools with Grade 4 Classes in Oman by Region and School Type

Region	School Type			
	Male	Female	Co-ed	Total
Muscat	36	40	2	78
North Batinah	46	40	16	102
South Batinah	39	36	12	87
Al-Dakhiliya	41	36	7	84
South Sharqiya	29	24	2	55
North Sharqiya	31	30	1	62
Al-Dhahira	37	36	13	86
Dhofar	36	30	20	86
Al-Wusta	2	0	3	5
Musandam	4	5	4	13
Total	301	277	80	658

Table 2
Distribution of Grade 4 Student Population by Region and School Type

Region	School Type			
	Male	Female	Co-ed	Total
Muscat	4403	3812	28	8243
North Batinah	5096	4627	122	9845
South Batinah	2515	2200	179	4894
Al-Dakhiliya	3451	2918	48	6417
South Sharqiya	1937	1576	7	3520
North Sharqiya	1753	1324	30	3107
Al-Dhahira	2055	1868	214	4137
Dhofar	1575	1483	386	3444
Al-Wusta	51	0	74	126
Musandam	325	287	64	676
Total	23162	20095	1152	44409

Sampling Procedure

After considering the key operating factors including simplicity, representativeness, practicability, affordability and cost-effectiveness, it was agreed that a stratified proportionate random sample of 68 schools would be adequate to provide the desirable accuracy of estimates of the parameters of interest.

The 1993-1994 Educational Database of the Ministry of Education has been utilized in the process of sample selection. First, a sampling frame was created including all public schools which have grade 4 classes. The sample frame was then divided into ten strata on the basis of education administration regions in the country, taking into account school type (male/female/coed.)

A proportionate sample of schools was selected (10% from each cell: Region X type of school) from the sampling frame from the stratum defined in each educational region. Following this procedure, a total number of 68 schools were selected. Three other schools were also added to the sample representing private schools from Muscat region. Of the three private schools two cone male and one coed) were from Muscat and one coed. school was from Dhofar. All the private schools were from urban areas.

The selected sample was then carefully examined to ensure its representativeness of schools in terms of location, type of school, number and qualifications of teachers, availability of facilities, ownership of schools, and shift of schools. This was done by conducting appropriate statistical tests (t-test and chi-square test) comparing the sample with the target population on every one of the aforementioned school characteristics.

The sample was found not to be statistically different from the population with respect to any of the variables at .05 level of significance. That is, in all the contrasts examined, the distribution of each variable in the sample was not different from its distribution in the population. Table (3) presents the distribution of sampled schools across regions by type of school, location, and authority and Table (4) shows the distribution of 4th grade students in the sampled schools across regions by type of school, school location and authority.

Table 3
Sampling Distribution of Schools Across Regions by School Type, School Location and Authority

Regions	Muscat	North Batinah	South Batinah	Al-Dakhili ya	South sharqiy a	North sharqiy a	Al Dhahira	Dhofar	Al-Wusta	Musand am	Total
School Locat-ion											
Urban	7	6	1	3	1	–	1	2	–	2	23
Rural	3	5	8	6	4	6	8	7	1	–	48
Total	10	11	9	9	5	6	9	9	1	2	71
School type											
Male	3	5	4	4	3	2	4	4	–	1	30
Female	4	4	4	4	2	3	4	4	–	1	30
Co-ed.	3	2	1	1	–	1	1	1	1	–	11
Total	10	11	9	9	5	6	9	9	1	2	71
School Author-ity											
MOE	7	11	9	9	5	6	9	9	1	2	68
Private	3	–	–	–	–	–	–	–	–	–	3
Total	10	11	9	9	5	6	9	9	1	2	71
Total	10	11	9	9	5	6	9	9	1	2	71

Table 4
Sampling Distribution of Students Across Regions by School Type, School Location* and Authority

Regions	Muscat	North Batinah	South Batinah	Al-Dakhili ya	South sharqiy a	North sharqiy a	Al Dhahira	Dhofar	Al-Wusta	Musand am	Total
School Locat-ion											
Urban	243	219	37	133	35	–	41	64	–	77	949
Rural	77	156	267	205	143	180	203	117	13	–	1361
Total	320	375	304	338	178	180	244	181	13	77	2210
School Type											
Male	118	170	129	149	101	83	90	71	–	36	947
Female	124	139	137	170	77	72	133	97	–	41	990
Co-ed.	78	66	38	19	–	25	21	13	13	–	273
Total	320	375	304	338	178	180	244	181	13	77	2210
School Author-ity											
MOE	242	375	304	338	178	180	244	181	13	77	2132
Private	78	–	–	–	–	–	–	–	–	–	78
Total	320	375	304	338	178	180	244	181	13	77	2210

* Schools were classified into urban and rural according to MOE definition.

Instruments

Four achievement tests were developed to assess learning achievement in the following four primary school subjects: Arabic Language, Science, Mathematics, and Life Skills. These tests were developed in accordance with standard procedures for devising achievement tests. These includes:

I. Mapping the curricula
This involved listing the objectives defined by the curricula for each subject.

II. Determining relative emphasis given to each objective.

III. Matching the weights given to various objectives.

IV. Listing the content substance (topics, concepts, skills, facts, etc.) implied and/or explicitly covered by the curricula.

V. Determining relative emphasis given to each area in the curricula.

VI. Preparing a table of specifications for the objectives showing levels of skills and content areas.

VII. Constructing test items using most appropriate item format for testing each objective and content. (at least 4-times the required number of items was the target).

VIII. lRevising the test items and subjecting them to independent expert reviews.

IX. Compling the test in a suitable format and writing appropriate instructions.

X. Trying the test on a representative sample under normal conditions.

XI. Analyzing the test data. conducting item analyses.

XII. Revising the test and modifying the test items in light of the item analyses information.

Test Development Teams:

Four specialized teams of experts (one each for Arabic, Math, Science and Life Skills) were formed. Each team was charged with the responsibility of developing the achievement test following the general guidelines and underlying criteria given to them and thoroughly discussed with each team. This was done through a workshop held in Muscat in January 1994 with technical assistance from NCHRD.

Piloting the Tests:

The pool of items for each test was randomly divided into several forms which were administered to a pilot sample. Each item was administered to at least 150 students scattered over 12 different schools representing different areas of location, and student gender.

Analysis of the Pilot Data:

Each test form was subjected to classical item analysis procedures. Every item was assessed by the test development teams and three experts from NCHRD in a workshop held in mid March 1994. The language, wording and format of the item along with its response alternatives and response formats were reexamined.

Lists of items were prepared indicating complete information on all the idices and criterion ratings on each item. Criteria were developed for the final selection of test items which were used to select test items for the final form of the test. Although the final form of each test retained a much smaller number of the original items, they maintained the relative weights of the original tables of specifications and thus conserved the content and curricular validity of each test.

Based on the results of item analysis and test statistics, and taking into consideration the different weights given to different content/skill levels, 40 items were selected to compose the final version of the Literacy Test (Arabic Language); 40 items were selected to compose the final version of the Numeracy Test; 50 items were selected for the final version of the Science Test; and 50 items were selected for the final version of the Life Skills Test. Reliability coefficients (Cronbach-alpha) are .89, .81, .87, and .84 for Arabic Language, Math, Science, and Life Skills Tests, respectively. Tables 5, 6, 7, and 8 respectively present the tables of specifications for Arabic, Science, Math, and Life Skills Tests.

Table (5)
Table of Specifications for the Arabic Language Test

Content/Skill	Knowledge & Comprehension	Application & Higher processes	Total
Reading	11	4	15
Linguistics	5	8	13
Dictation	7	3	10
Composition		2	2
Total	23	17	40

Table (6)
Table of Specifications for the Science Test

Content / Skill	Knowledge	Comprehension	Application	Total
Human	8	6	2	16
Living Creatures	5	3	1	9
Environment	3	3	2	8
Natural Sciences	5	5	2	12
Universe	2	2	1	5
Total	23	19	8	50

Table (7)
Table of Specifications for the Mathematics Test

Content/Skill	Knowledge	Comprehension	Application	Higher Processes	Total
Numbers	1	11	3	2	17
Fractions		3	1	1	5
Geometry	2	5	1	2	10
Measurement	3	1	4		8
Total	6	20	9	5	40

Table (8)
Table of Specifications for the Life Skills Test

Content/Skill	Knowledge	Application	Total
Health & Nutrition	9	6	15
Environment	6	4	10
Civic Education	12	3	15
Daily Behavior	3	7	10
Total	30	20	50

Context of Learning

Because learning does not occur in a vacuum, it was decided to collect information on a number of contextual variables which have an impact on teaching/learning processes. These variables include students' home environment, family background, instructional practices, teachers' characteristics, administrative practices and other school variables, and students' attitudes toward themselves and their schools. All these factors

were assessed by four carefully designed, developed and field-tested self-reporting instruments, namely: (1) Parent Questionnaire, (2) Principal Questionnaire, (3) Teacher Questionnaire, and (4) Student Questionnaire. Annex 1 presents the domains of variables covered in each questionnaire.

Data Collection

Standardized procedures for instructing students and establishing conditions for testing were developed by the Omani National Task Force and pilot tested. To ensure reasonably accurate and generalizable information capable of generating sufficiently valid conclusions, a team of regional coordinators and a team of 71 test administrators were trained and charged with the responsibility of the test administration and data collection. Field work was supervised by the Omani National Task Force to ensure uniform standards of test administration. Data was collected during the last week of April 1994.

Data Analysis

Stock-Taking and Checking: As the completed tests started coming back from the field, they were checked against prepared lists of students in the targeted grade 4 class in each school. Each student and school was given a specific code number. Any delay in the arrival of test packages from any test administrator was tracked and 100% recovery was ensured.

Preparing Codebooks: A detailed code-book defining each variable, variable labels, range of values, and value labels was prepared for each questionnaire and achievement test.

Data Entry Form: Data entry forms were prepared for each test and questionnaire using SPSS/PC's data entry procedure, and data were entered directly from the tests and questionnaires under the supervision of the National Task Force. Data entry errors were controlled by selecting randomly 5% of the protocols entered by each individual daily and checking them by independent double entry. If any person's work produced more than 2% errors, the whole batch was entered against the aforestated validation procedure. When the data entry was completed, different data files were merged together and preliminary statistical analyses were performed on each variable in each instrument with the purpose of detecting any abnormalities in the data. If a particular error

could not be tracked down and corrected directly in the raw data files, it was referred back to the test or questionnaire and finally resolved.

Analysing the Data: Due to the diversified nature of variables and target populations, a two-stage data analysis and interpretation strategy was developed. The first stage vas concerned with verificatory, validatory and descriptive analysis of each instrument. Several statistical procedures applied at this stage included including frequency analysis, inter-item correlations, scale and subscale reliability indices, descriptive statistics and variance analyses.

The purpose of the first set of analyses was to establish the reliability and other properties of interest of each instrument, while the purpose of the descriptive and variation analyses was to establish the current standards of achievement and current norms of certain practices at the national, regional, education authority, student gender, and location (rural/urban) levels, as well as, to study the differences in the performance of students in different groups of schools defined by the preceding set of exogenous factors.

The second-stage analyses involved deriving indicator indices and parsimonious sets of latent concepts in the major domains of variables and studying relationships between student achievement and important family background, parental, community, school and classroom factors. This analysis involved also searching for explanatory statistical models using multiple regression.

RESULTS

I. ACHIEVEMENT RESULTS

A. Arabic Language Test

Performance at the National Level

The Arabic Language Test was administered to 2210 fourth grade students (1,112 boys and 1,098 girls) in the sampled schools. Table (9) presents average percent correct scores on the whole test and its subscales.

Table 9
Average Percent Correct on the Arabic Language Test

Subscale	Average percent correct	Standard Deviation	Standard Error	Lower 10%		Upper 10%	
				Min	Max	Min	Max
Total Score Content	57.26	20.2	.43	0	31.25	86.56	100
Reading	66.23	20.9	.44	0	40.00	93.33	100
Linguistics	50.25	23.0	.51	0	23.08	84.62	100
Dictation	55.93	26.1	.56	0	20.00	90.00	100
Composition	42.31	33.6	.72	0	0	100	100
Skill							
Knowledge & Comprehension	61.61	20.7	.44	0	34.78	91.30	100
Application & Integration	51.38	22.1	.47	0	23.53	83.82	100

It can be seen from Table (9) that the average percent correct on the test is 57.26. Students' performance on the content subscales is in the following order: Reading, Dictation, Linguistics, and Composition. In terms of skills subscales, students' performance on items measuring knowledge and comprehenstion was higher (61.61%) than their performance on the application and integration subscales. The ranges of the average percent correct stores of the upper 10% of students is presented in Table 9 for the content subscores and the skills subscores. A graphic presentation of the average percent correct scores on the test subscales is presented in Figure (1).
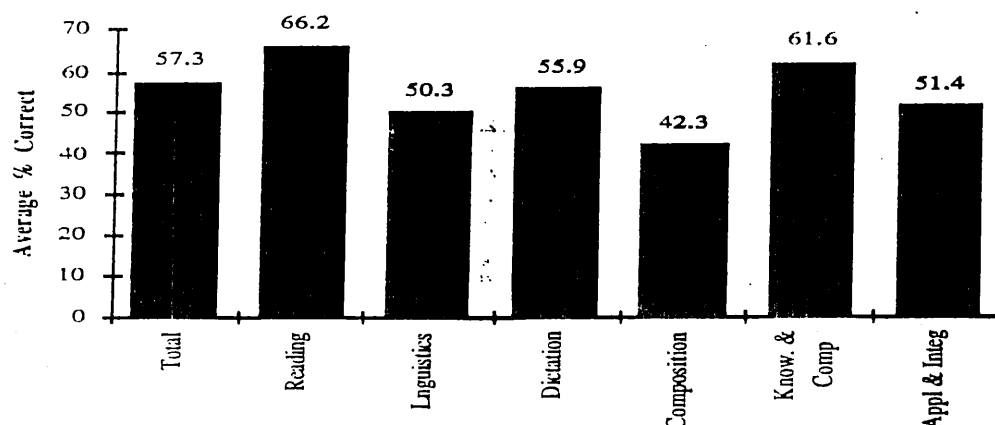
Figure (1)

Average Percent Correct Scores on the Arabic Language Test Subscales

Performance Across Regions

Table (10) displays the average percent correct score on the whole test for each region. Figure (2) presents the bar graphs of the performance by Region.

Table 10

Average Percent Correct Score, Standard Error, and 95% Confidence Interval on the Arabic Test in Each Region

Region	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Muscat	55.45	21.5	1.38	52.69–58.21
North Batinah	53.89	20.3	1.05	51.79–55.99
South Batinah	52.75	19.2	1.10	50.55–54.95
Al-Dakhiliya	58.34	20.2	1.10	56.14–60.54
South Sharqiya	58.63	17.6	1.32	55.99–61.27
North Sharqiya	51.06	18.3	1.37	48.32–53.80
Al-Dhahira	62.07	21.00	1.34	59.39–64.75
Dhofar	63.54	16.70	1.24	61.06–66.02
Al-Wusta	47.07	16.4	4.54	37.99–56.15
Musandam	60.76	21.31	2.43	55.90–65.62

Table 10 and Figure 2 clearly show that Dhofar, Al-Dhahira, and Musandam students scored higher than other students in other regions. The lowest performance was for students of Al Wusta region.
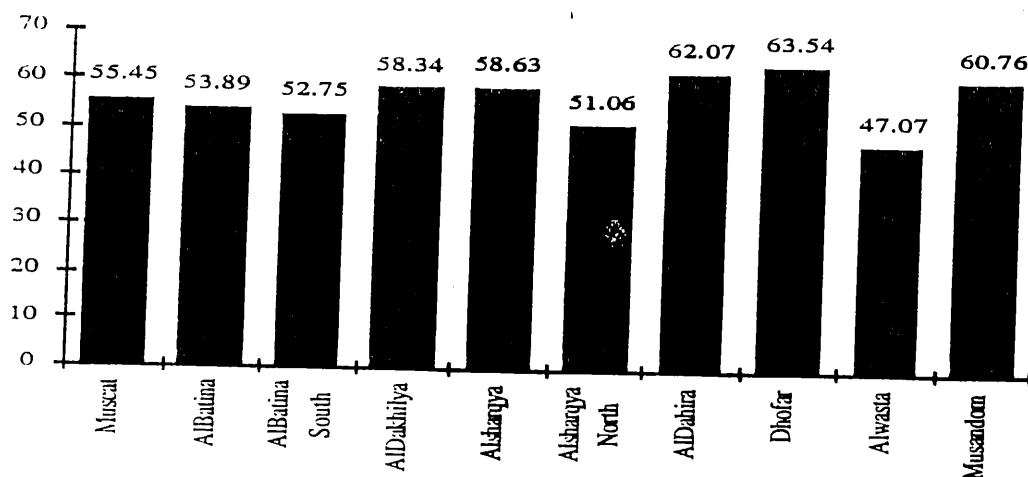
Figure (2)
Average Percent Correct Score on the Arabic Test in Each Region

On almost all content subscales (Table 11), the performance of Dhofar and Al Dahira students was the highest while Al Wusta region students was the lowest. For all regions, with the exception of Al Wusta, students' performance was in the following order: reading, dictation, linguistics. and composition. In Wusta, student performance on the linguistics items (although not statistically significant) was higher than their performance in composition.

Table (11)
Average Percent Correct and Standard Error on the Arabic Test Subscales in Each Region

Regions	Muscat	North Batinah	South Batinah	Al-Dakhili ya	South sharqiy a	North sharqiy a	Al Dhahira	Dhofar	Al-Wusta	Musand am
Content Subscales										
Reading										
Average % correct	62.4	65.4	62.3	65.7	69.36	58.96	70.8	72.6	60	68.83
Standard Error	1.51	1.09	1.22	1.13	1.30	1.37	1.39	1.31	4.59	2.27
Standard Deviation	23.5	21.2	21.3	20.7	17.4	18.4	21.7	17.6	16.6	19.9
Linguistics										
Average % Correct	49.8	45.31	48.00	51.57	49.48	43.00	54.5	56.27	42.6	54.74
Standard Error	1.58	1.23	1.30	1.26	1.69	1.64	1.62	1.52	4.8	3.5
Standard Deviation	24.5	23.8	22.6	23.4	22.5	22.0	25.3	20.4	17.4	27.6
Dictation										
Average% Correct	55.7	51.17	48.78	58.11	57.25	52.67	61.07	62.49	37.69	56.62
Standard Error	1.73	1.28	1.41	1.46	1.88	1.82	1.77	1.66	6.90	3.16
Standard Deviation	27.00	24.7	24.6	26.8	25.1	24.4	27.6	22.3	24.9	27.9
Compostion										
Average% Correct	39.1	36.53	31.25	48.34	44.52	35.97	50.82	48.14	25.96	47.08
Standard Error	2.14	1.82	1.68	1.85	2.15	2.45	2.27	2.17	9.86	3.84
Standard Deviation	33.2	25.3	29.3	34.00	28.7	32.8	35.4	29.1	35.5	34.1
Skill Subscales										
Knowledge										
Average% Correct	59.05	58.6	58.1	62.04	63.61	55.56	65.84	68.36	53.18	64.77
Standard Error	1.42	1.08	1.18	1.12	1.34	1.42	1.40	1.27	5.10	2.36
Standard Deviation	22.2	20.9	20.5	20.6	17.9	19.1	21.8	17.1	18.4	20.7
Appl & Integ										
Average% Correct	50.6	47.5	45.5	53.3	51.9	44.98	56.97	57.00	38.8	55.35
Standard Error	1.47	1.13	1.16	1.22	1.53	1.54	1.42	1.42	4.5	2.8
Standard Deviation	22.9	21.8	20.3	22.4	20.4	20.	22.2	19.2	16.2	24.6

Performance by Gender

Results (Table 12) indicated that the performance of female students was statistically significantly ($\alpha=.05$) higher on the total score and on all content and skill subscales than that of male students. The difference between means of male and female students was on the average 6% and it was the highest in composition (15%). A graphic presentation of the differential performance of male and female students on each subscale and total score is shown in Figure 3.

Table (12)
Average Percent Correct on Arabic Test Subscales for
Male & Female Students

	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score				
Males	54.30	20.2	.61	53.08–55.52
Females	60.27	19.70	.59	59.09–61.45
Content Subscales				
Reading				
Males	64.37	21.5	.64	63.09–65.65
Females	68.11	20.1	.61	66.89–69.33
Linguistics				
Males	46.96	23.8	.71	45.54–48.38
Females	53.58	23.5	.71	52.16–55.00
Dictation				
Males	52.56	26.00	.78	51.00–54.12
Females	59.34	25.8	.78	57.78–60.90
Composition				
Males	35.11	33.00	.99	33.13–37.09
Females	49.61	32.70	.99	47.63–51.59
Skill				
Kno. & Comp.				
Males	59.01	20.90	.63	57.75–60.27
Females	64.24	20.20	.61	63.02–65.46
Applc. & Integ.				
Males	47.91	21.90	.66	46.59–49.23
Females	54.89	21.70	.65	53.59–56.19
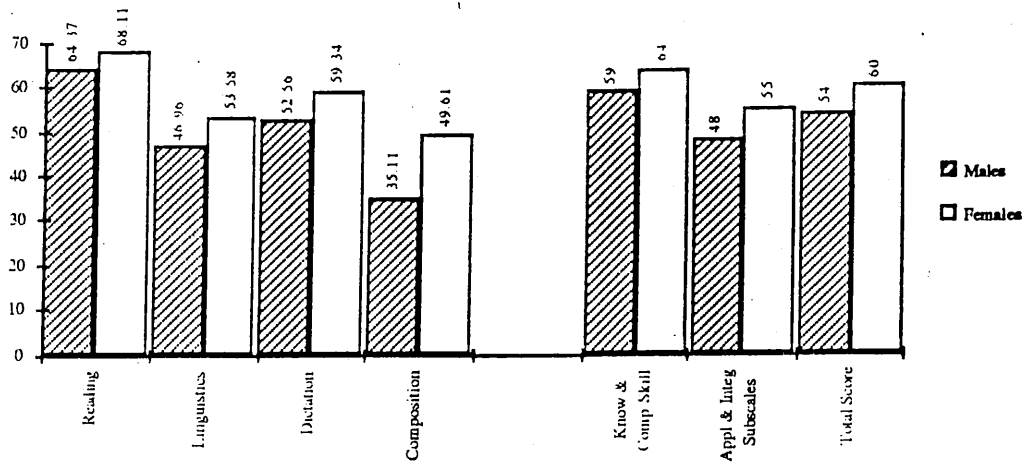
Figure (3)

Average Percent Correct Scores on the Arabic Test Subscales by Gender

Similar patterns of performance were noticed for boys and girls. For both, the average percent correct score was highest in reading, followed by dictation. linguistics and finally composition. At the skills level, the order from highest to lowest for both males and females is as follows: knowledge and comprehension. followed by application and Integration.

Performance by Educational Authority

The Arabic Language test was administered to 2132 students from the Ministry of Education (MOE) schools and to only 78 students from private schools. Because private schools are located in Muscat region and only a small number of fourth grade students from private schools participated in the survey, any conclusion based on the findings should be made with reservations. Table (13) shows the performance of students on the Arabic Language Test by educational authority, while Figure (4) presents their bar graph.

Table (13)
Average Percent Correct Scores on the Arabic Language Test Subscales in Each Educational Authority

		Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score					
	MOE	56.73	20.10	.43	55.87–57.59
	Private	71.88	17.20	1.95	67.98–75.78
Content Subscales					
Reading					
	MOE	65.78	20.90	.45	64.88–66.68
	Private	78.46	16.30	1.48	75.50–81.42
Linguistics					
	MOE	49.74	23.70	.51	48.72–50.76
	Private	64.10	23.60	2.68	58.74–69.46
Dictation					
	MOE	55.28	26.00	.56	54.16–56.40
	Private	73.59	24.20	2.74	68.11–79.07
Composition					
	MOE	41.50	33.40	.72	40.05–42.94
	Private	64.58	32.10	3.64	57.30–71.86
Skill					
Kno. & Comp.					
	MOE	61.13	20.70	.45	60.23–62.03
	Private	74.69	17.40	1.97	70.75–78.63
Appl. & Integ.					
	MOE	50.77	21.90	.47	49.83–51.71
	Private	68.08	19.60	2.22	63.64–72.52

Examination of Table (13) reveals that private school students out-performed Ministry of Education students on the test as a whole and on all its content and skill subscales. The difference between the means of private school students and the Ministry of Education students is on the average 15%. This difference was the highest in dictation (17%). In both authorities, student performance was the highest in reading and lowest in composition. For Ministry of Education students it was lowest in composition, while for private school students it was lowest in linguistics.
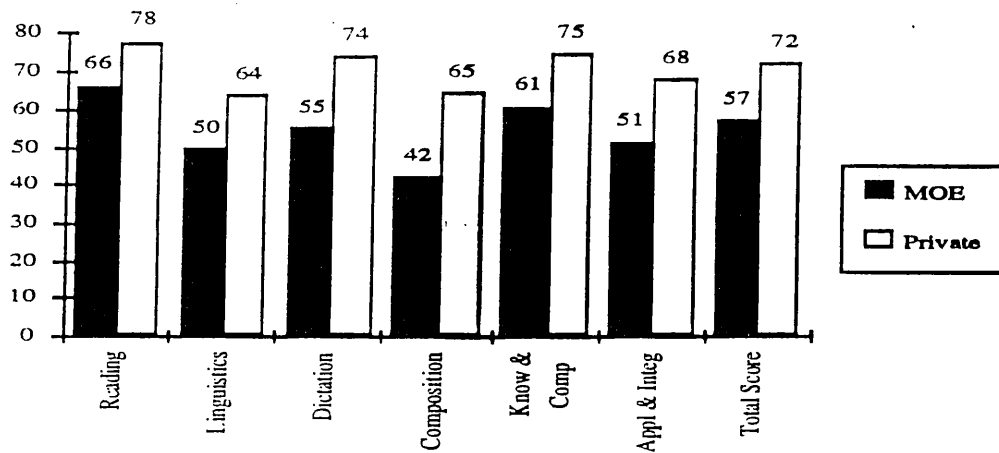
Figure (4)

**Average Percent Correct Scores on the Arabic Language Test
by Educational Authority**

Performance by School Location

Out of 2.210 fourth grade students who took the Arabic Test, 849 are attending urban schools. Table (14) and Figure (5) show the differential performance of the fourth grade students in urban and rural schools on each subscale and the total score on the Arabic Language Test.

Table (14)
**Average Percent Correct on the Arabic Test Subscales in Urban
and Rural School Location**

Location		Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score					
	Urban	59.63	20.2	.69	58.25–61.01
	Rural	55.79	20.00	.54	54.71–56.87
Content Subscales					
Reading					
	Urban	68.57	20.60	.71	67.15–69.99
	Rural	64.77	23.00	.57	63.63–65.91
Linguistics					
	Urban	52.47	23.90	.82	50.83–54.11
	Rural	48.86	23.70	.64	47.58–50.14
Dictation					
	Urban	58.17	26.40	.91	56.35–59.99
	Rural	54.53	25.80	.70	53.13–55.93
Composition					
	Urban	46.41	34.50	1.18	44.05–48.77
	Rural	39.76	32.90	.89	37.98–41.54
Know & Comp					
	Urban	63.61	20.40	.70	62.21–65.01
	Rural	60.36	20.80	.56	59.24–61.48
Appl & Integ					
	Urban	54.24	22.2	.76	52.72–55.76
	Rural	49.60	21.8	.59	48.42–50.78
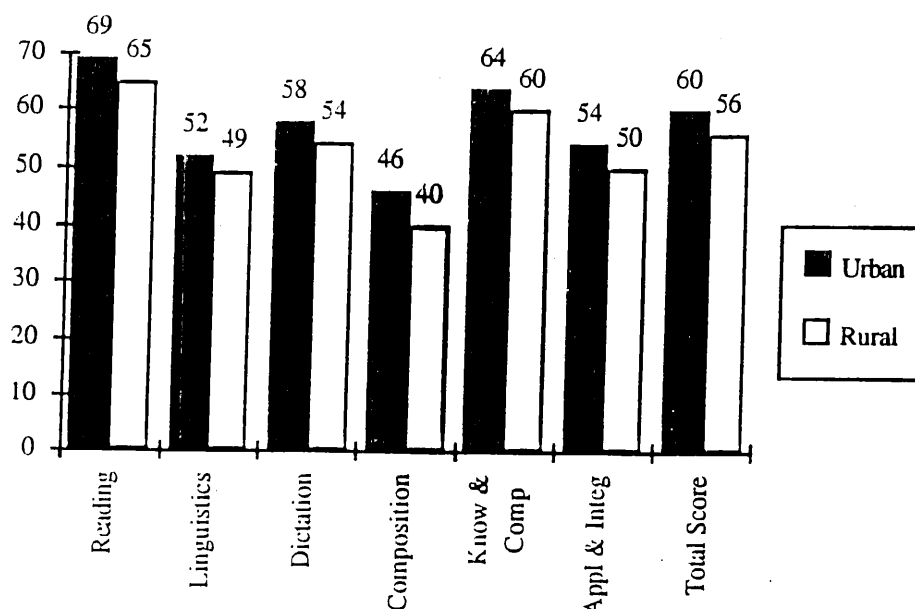
Figure (5)

**Comparative Performance of the Urban and Rural Students
on the Arabic Language Test**

It can be seen from Table (14) and Figure (5) that the performance of urban school students was statistically significantly ($\alpha=.05$) higher on the total score and on all content and skill subscales than rural school students. The difference between the means of urban school students and rural school students ranges from 3% to 7%, with an average of 4% difference. The order of performance from highest to lowest was identical for both locations. That is, for both urban and rural students the highest performance was in reading and the lowest was in composition.

**B.   Science Test
Performance at the National Level**

The Science Test was administered to 2,209 students (1,116 males and 1,093 females) in 71 schools representing all regions in the Sultanate of Oman.

Table (15) presents the average percent correct scores on the Science Test and its subscales.

Table 15
Average Percent Correct, Standard Error, Minimum and Maximum Scores on the Science Test

Subscale	Average percent correct	Standard Deviation	Standard Error	Lower 10%		Upper 10%	
				Min	Max	Min	Max
Total Score	48.53	18.2	.39	10.42	22.92	75.00	97.92
<u>Content</u>							
Human	49.52	21.1	.45	.00	20.00	80.00	100.00
Living Creatures	41.55	22.7	.48	.00	12.50	75.00	100.00
Environment	53.88	23.2	.49	.00	25.00	87.00	100.00
Natural Sciences	44.94	22.0	.47	.00	16.67	75.00	100.00
Universe Skills	56.76	29.30	.62	.00	20.00	100.00	100.00
<u>Skills</u>							
Knowledge	50.30	20.2	.43	4.55	22.73	77.27	100.00
Comprehension	46.97	19.7	.42	.00	22.12	72.22	100.00
Appl & Integ	47.13	22.4	.48	.00	12.50	75.00	100.00

It can be seen from Table (15) that the avarage percent correct score on the test is 48.53. That is, students on the average were able to respond correctly to 49% of the test items. On the test content subscales, the means range from 41.55 (living creatures subscale) to 56.76 (universe subscale). Performance of the lowest 10% of students ranges from 0 (on all content subscales) to 25 (on the environment subscale). The performance of the upper 10% of students ranges from 75 (on both living creatures and natural sciences subscales) to 100 on all content subscales. On skills subscales, performance was highest on the knowledge subscale than the other two subscales. A graphic presentation of the average percent correct scores on the science test and its subscales is shown in Figure (6).
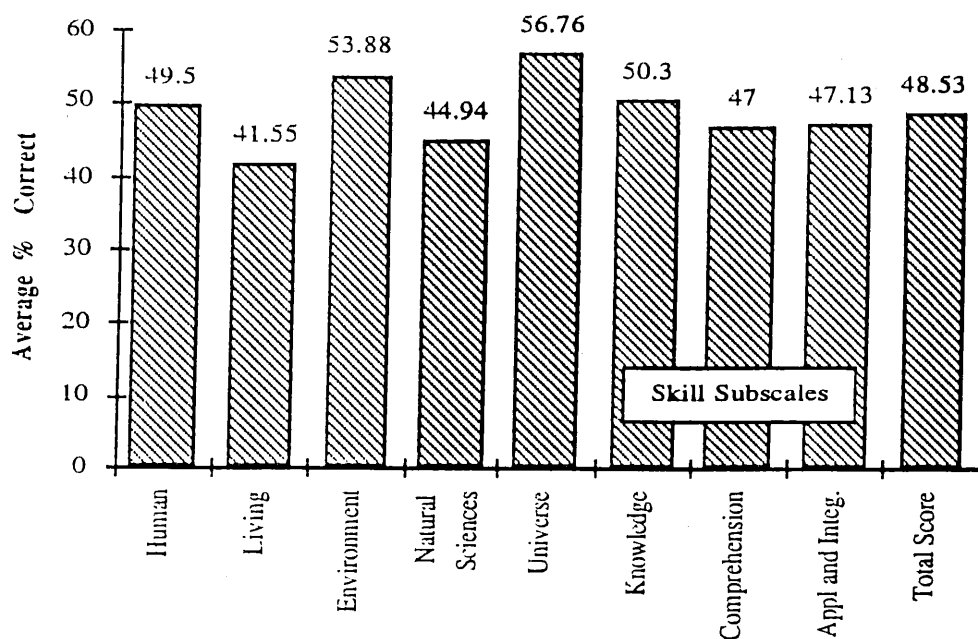
Figure (6)

Average Percent Correct Scores on the Science Test Subscales

Performance Across Regions

Table (16) shows the performance of Fourth grade students on the Science Test in each region, and Figure (7) presents a graphic display of interregional comparsions.

Table 16
Average Percent Correct Score, Standard Error, and 95 CI
on the Science Test in Each Region

Region	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Muscat	50.96	19.50	1.25	48.46–53.46
North Batinah	46.05	19.00	.98	44.09–48.01
South Batinah	42.25	17.00	.97	40.31–44.19
Al-Dakhiliya	51.05	17.50	.96	49.13–52.97
South Sharqiya	48.88	16.7	1.25	46.38–51.38
North Sharqiya	43.83	16.00	1.19	41.45–46.21
Al-Dhahira	51.51	18.10	1.14	49.23–53.79
Dhofar	50.41	16.60	1.24	47.93–52.89
Al-Wusta	44.55	13.8	3.81	36.93–52.17
Musandam	49.18	17.60	2.02	45.14–53.22
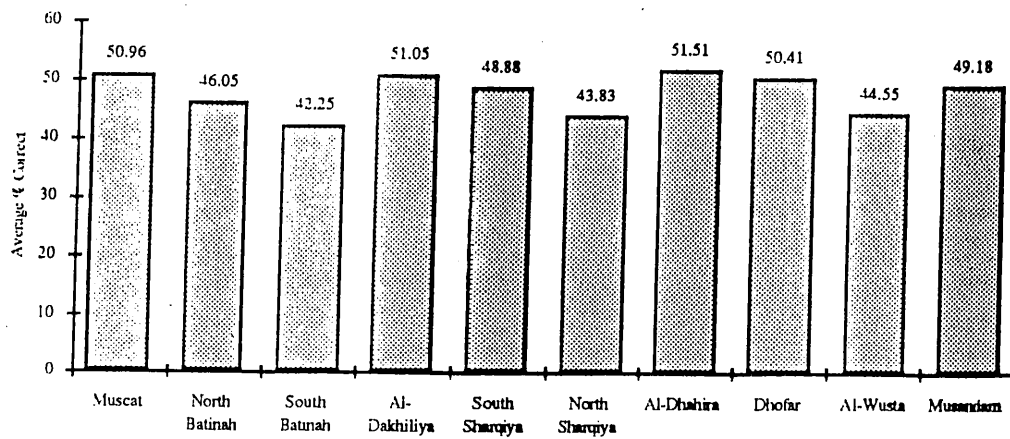
Figure (7)

Average Percent Correct Score on the Science Test in Each Region

Examination of Table (16) and Figure (7) reavels that the performance of students in Al-Dahira, Al Dakhiliya, Muscat, and Dhofar regions was better than that of students in North Batinah & North & South Sharqiya regions.

On almost all content subscales (Table 17), the performance of students in Al-Dahira, Dhofar and Muscat regions was higher than the performance of students in other regions. Students' performance in both Al Wusta and South Batinah was the lowest on almost all content subscales. In all regions (with the exception of North Batinah and South Batinah), students performance was the highest on the universe subscale, and the lowest was on the living creatures subscale.

Table (17)
Average Percent Correct and Standard Error on the Science Test Subscales in Each Region

Regions	Muscat	North Batinah	South Batinah	Al-Dakhiliya	South sharqiya	North sharqiya	Al Dhahira	Dhofar	Al-Wusta	Musandam
Content Subscales										
Human										
Average % correct	53.91	45.70	43.78	53.31	46.74	46.74	51.47	50.22	49.23	49.47
Standard Error	1.48	1.12	1.16	1.07	1.37	1.53	1.34	1.42	4.10	2.44
Standard Deviation	22.9	21.8	20.2	19.6	18.3	20.5	21.2	19.00	14.8	21.3
Living Creatures										
Average % Correct	42.32	39.91	35.81	41.23	44.66	33.68	46.07	43.54	34.62	43.09
Standard Error	1.48	1.08	1.20	1.20	1.69	1.50	1.58	1.66	4.73	2.79
Standard Deviation	22.9	23.00	20.8	22.00	22.5	20.1	25.1	22.2	17.0	24.4
Environment										
Average % Correct	52.96	53.91	47.81	56.04	53.58	51.39	56.67	56.46	48.08	52.96
Standard Error	1.53	1.19	1.34	1.25	1.69	1.74	1.44	1.66	5.63	2.63
Standard Deviation	22.8	23.0	23.3	22.8	22.5	23.4	22.8	22.2	20.3	22.9
Natural Sciences										
Average % Correct	47.68	43.63	39.16	48.06	46.02	38.56	47.05	45.83	39.10	45.00
Standard Error	1.67	1.20	1.17	1.13	1.62	1.43	1.30	1.50	5.03	2.51
Standard Deviation	25.9	23.2	20.4	20.1	21.7	19.2	20.6	20.1	18.1	21.9
Universe										
Average % Correct	60.58	50.11	46.47	59.16	61.35	51.89	62.79	63.22	53.85	60.79
Standard Error	1.96	1.51	1.56	1.56	2.15	2.16	1.77	2.13	8.28	3.30
Standard Deviation	30.4	29.1	27.2	28.7	28.9	28.0	28.6	29.9	29.9	28.7

Gender Differences on the Science Test

Table (18) shows the comparative performance of males and females on the Science Test subscales, and Figure (8) gives its graphic display.

Table (18)
Average Percent Correct Score, Standard Error, and 95%CI of Male and Female Students on the Science Test Subscales

	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score				
Males	47.64	18.4	.55	46.54–48.74
Females	49.43	18.1	.55	48.33–50.53
Content Subscales				
Human				
Males	47.47	20.7	.62	46.23–48.71
Females	51.62	21.4	.65	50.32–52.92
Living Creatures				
Males	41.68	23.0	.69	40.30–43.06
Females	41.41	22.4	.68	40.05–42.77
Environment				
Males	52.86	23.0	.69	51.48–54.24
Females	54.92	23.4	.71	53.50–56.34
National Sciences				
Males	44.46	22.0	.66	43.14–45.78
Females	45.43	22.1	.67	44.09–46.77
Universe				
Males	57.03	30.1	.90	55.23–58.83
Females	56.49	28.4	.86	54.77–58.21
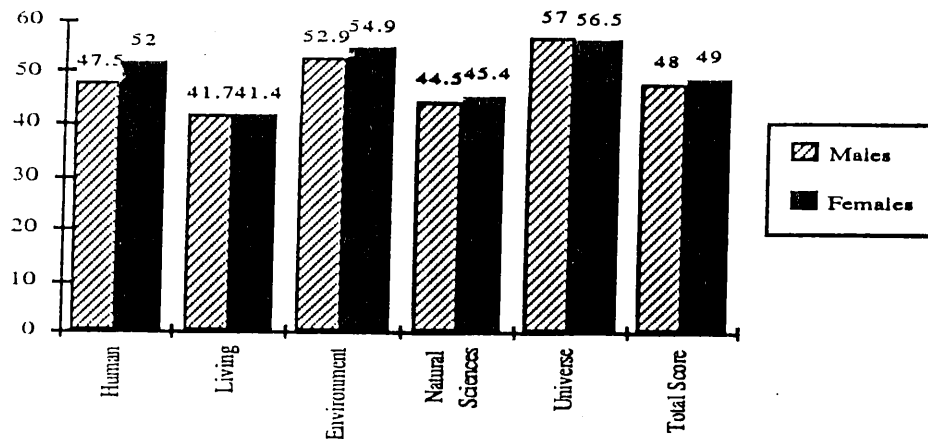
Figure (8): Comparative Performance of Male and Female Students on Various Subscales of the Science Test

Results displayed in Table (18) and Figure (8) indicate that the performances of males & females were not statistically significantly different (α=.05) on the Total Score, as well as, on four of the five content subscales. The only significant difference between males and females was on their performance on the human subscale where the performance of females was higher than that of the males. The order of the performance on the content subscales was the same for male and female students. That is, the order from highest to lowest is as follows: Universe, Environment, Human, Natural Sciences, and Living Creatures.

Performance by Educational Authority

Table (19) shows related statistics and Figure (9) gives a graphic display of the performance of fourth grade students on the Science Test and its content subscales by educational authority.

Table (19)
Average Percent Correct Score, Standard Error, and 95%CI on the Science Test Subscales in Each Education Authority

	Ministry of Education	Private Schools
Total Score		
Average % Correct	48.01	62.55
Standard Deviation	18.00	19.00
Standard Error	.39	2.15
95% CI	47.23–48.79	58.25–66.85
Content Subscales		
Human		
Average % Correct	48.85	65.21
Standard Deviation	20.90	20.80
Standard Error	.45	2.35
95% CI	48.05–49.85	60.51–69.91
Living Creatures		
Average % Correct	40.79	62.18
Standard Deviation	22.40	21.20
Standard Error	.48	2.40
95% CI	39.83–41.75	57.38–66.98
Environment		
Average % Correct	53.50	64.10
Standard Deviation	23.1	24.3
Standard Error	.50	2.75
95% CI	52.6–54.50	58.6–69.6
Natural Sciences		
Average % Correct	44.5	55.56
Standard Deviation	21.90	22.90
Standard Error	.47	2.59
95% CI	43.6–45.69	50.38–60.74
Universe		
Average% Correct	56.29	69.49
Standard Deviation	29.30	27.30
Standard Error	.63	3.09
95% CI	55.03–57.55	63.31–75.67
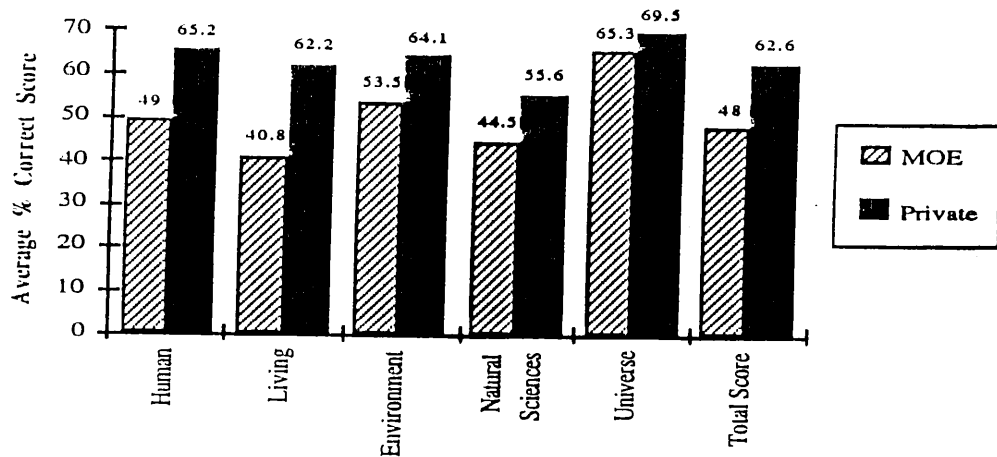
Figure (9)

Average Percent Correct Scores on the Science Test and
its Subscales in Each Education Authority

Results shown in Table (19) and Figure (9) clearly indicate that private school students scored higher (α=.05) on the total score and all content subscales than Ministry of Education Students. Students in both MOE schools and private schools scored highest on the Universe subscale. MOE students scored lowest on living subscale, while private schools students scored lowest on Natural Science subscale.

Performance by School Location

Table (20) and Figure (10) present the levels of performance of the Fourth grade students by school location.

Table (20)
Table (20)
**Average Percent Correct Scores on the Science Test Subscales
in Urban and Rural Schools**

	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score				
Urban	50.93	18.70	.64	49.65–52.21
Rural	47.05	17.80	.48	46.09–48.01
Content Subscales				
Human				
Urban	52.68	21.90	.75	51.18–54.18
Rural	47.58	20.40	.55	46.48–48.68
Living Creatures				
Urban	46.22	22.80	.78	44.66–47.78
Rural	38.67	21.20	.60	37.47–39.87
Environment				
Urban	55.60	23.30	.80	54.00–57.20
Rural	52.81	23.20	.63	51.55–54.07
Natural Sciences				
Urban	46.01	22.40	.77	44.47–47.55
Rural	44.28	21.80	.59	43.10–45.46 ·
Universe				
Urban	57.57	28.80	.99	55.59–59.55
Rural	56.26	29.60	.80	54.66–57.86
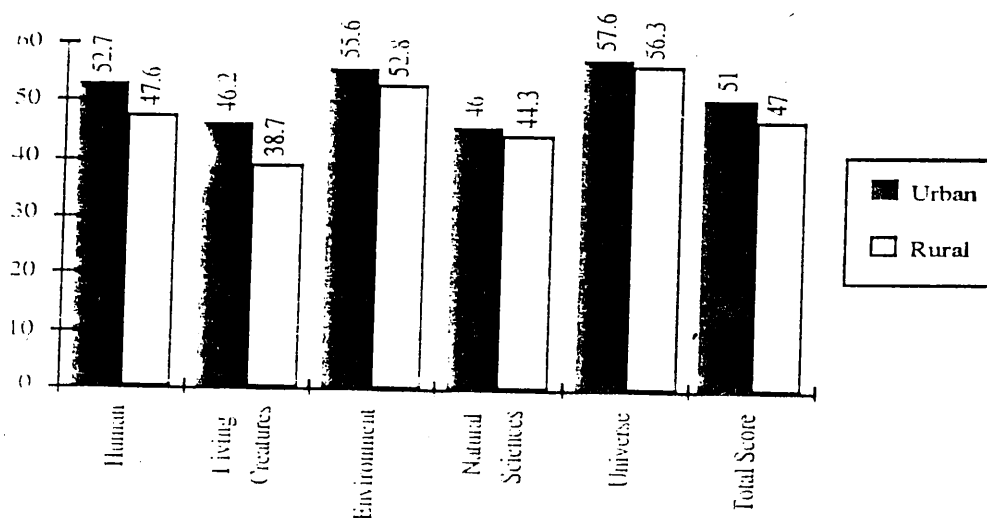
Figure (10)
**Average Percent Correct Scores on the Science Test Subscales
in Urban and Rural Schools**

Examination of Table (20) and Figure (10) reveals that the performance of urban school students on the total score and on the human and living creatures subscales was statistically significantly higher ($\alpha=.05$) than that of rural school students. Performance on the remaining three content subscales was not statistically different between urban and rural students. The order of performance from the highest to the lowest for both urban and rural students was similar.

C. Mathematics Test
Performance at the National Level

The Mathematics Test was administered to 2,213 students (1,123 males and 1.090 females) in 71 schools representing all regions in the Sultanate of Oman. Results indicated that the national average on the test is 54 which means that on the average students were able to answer 54% of the test items correctly.

Table (21) presents the average percent correct scores on the test and its subscales.

Table (21)
Average Percent Correct on the Mathematics Test

Subscale	Average percent correct	Standard Deviation	Standard Error	Lower 10%		Upper 10%	
				Min	Max	Min	Max
Total Score	54.31	16.3	.35	10.00	32.50	77.50	100.00
Content							
Numbers	63.78	20.4	.43	5.88	35.29	88.24	100.00
Fractions	51.46	21.4	.45	.00	20.00	80.00	100.00
Geometry	52.21	21.4	.46	.00	30.00	80.00	100.00
Measurement	38.58	21	.45	.00	12.50	62.50	100.00
Skills							
Knowledge	46.57	23.1	.49	.00	16.67	83.33	100.00
Comprehension	62.18	19.3	.41	10.00	35.00	90.00	100.00
Application	44.22	19.3	.41	.00	22.22	66.67	100.00
Integration	50.27	24.2	.51	.00	20.00	80.00	100.00

Results presented in Table (21) show that the performance was the highest on the numbers subscale (63.78) and the lowest on the measurement subscale (38.58) which indicates a 25 point difference. Performence of the lower 10% of students ranges from 0 (on four of the five content subscales) to a maximum of 35.3 on the numbers subscale. For the upper 10% of students, the scores range from a minimum of 62.5 on the measurement subscale to 100 on all content subscales.

On the skill subscales, the average percent correct scores range from 44.22 on application related items to 62.18 on comprehension items. A graphic presentation of the average percent correct scores on the Math test and its subscales is shown in Figure (11).
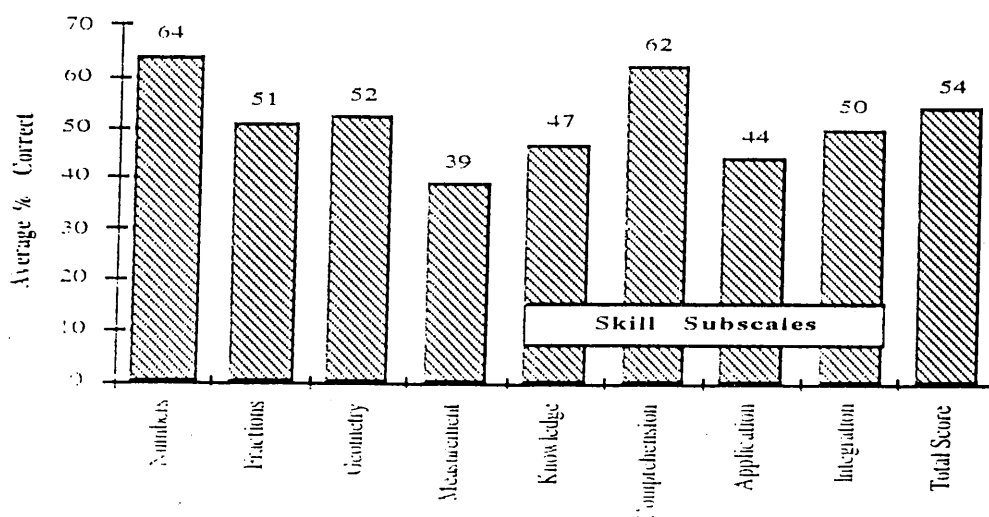
Figure (11)
Average Percent Correct Scores on the Math Test Subscales

Performance Across Regions

Table (22) and Figure (12) present the levels of performance on the Math Test by region.

Table 22
Average Percent Correct Score, Standard Error, and 95% Confidence Interval on the Math Test in Each Region

Region	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Muscat	53.39	16.8	1.08	52.31–56.63
North Batinah	50.22	16.3	.85	48.52–51.92
South Batinah	49.88	16.1	.92	48.04–51.72
Al-Dakhiliya	56.56	16.5	.90	54.76–58.36
South Sharqiya	56.77	15.5	1.16	54.45–59.09
North Sharqiya	53.85	14.1	1.05	51.75–55.95
Al-Dhahira	55.23	15.4	.97	53.29–57.17
Dhofar	58.87	15.1	1.12	56.63–61.11
Al-Wusta	51.92	^.7	2.70	46.52–57.32
Musandam	53.80	15.6	1.78	50.24–57.36
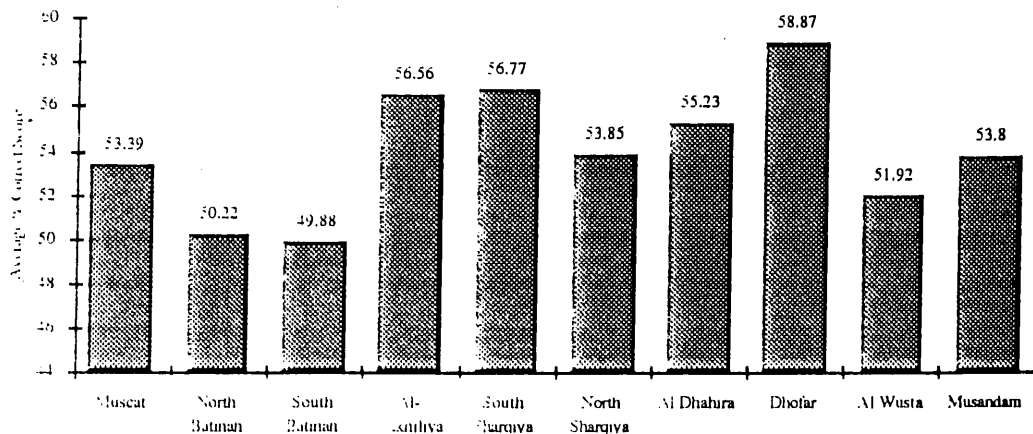
Figure (12)
Average Percent Correct Score on the Math Test in Each Region

Examination of Table (22) and Figure (12) reveals that the performance of Dhofar region students was the highest (59) and the performance of South Al Batinah region students was the lowest (50).

On all content subscales (Table 23), Dhofar region students outperformed students in all other regions. In all regions students' performance was the highest on Numbers subscale, and the lowest on the measurement subscale for Muscat, North Al Batinah, South Al Batinah, Al Dakhiliya, North Sharqiya, Al Wusta, and Musandam students whereas

it is the lowest for Dhofar. AlDahira and Al-Sharqiya on the fractions subcale.

Table 23
Average Percent Correct Score and Standard Error
on the Math Test Subscales in Each Region

Regions	Muscat	North Batinah	South Batinah	Al-Dakhiliya	South sharqiya	North sharqiya	Al Dhahira	Dhofar	Al-Wusta	Musandam
Content Subscales Numbers										
Average % Correct	63.08	58.21	58.22	66.39	65.86	64.94	65.52	69.65	65.16	62.26
Standard Deviation	20.3	20.8	21.2	20.6	18.8	19.4	19.9	17.9	11.9	19.2
Standard Error	1.31	1.08	1.22	1.12	1.41	1.45	1.26	1.33	3.29	2.18
Fractions										
Average % Correct	52.07	51.37	48.95	51.25	51.69	51.51	52.14	54.36	49.23	49.35
Standard Error	1.42	1.14	1.22	1.17	1.54	1.48	1.38	1.58	7.02	2.36
Standard Deviation	22.2	21.9	21.2	21.4	20.6	19.8	21.9	21.2	25.3	20.7
Geometry										
Average % Correct	50.99	47.18	47.43	55.00	56.91	50.50	52.18	58.67	45.38	52.21
Standard Error	1.46	1.04	.2	1.19	1.54	1.51	1.35	1.54	3.69	2.10
Standard Deviation	22.7	20.1	21.2	21.9	20.5	20.2	21.5	20.7	13.3	18.4
Measurement										
Average % Correct	36.62	36.33	35.77	40.96	56.91	50.50	52.18	58.67	33.65	40.58
Standard Error	1.49	1.06	1.14	1.11	1.54	1.51	1.35	1.54	3.58	2.41
Standard Deviation	23.2	20.5	19.9	20.4	21.0	18.7	19.1	21.2	12.9	21.2

Performance by Gender

Results presented in Table (24) and Figure (13) indicate that the difference between the performance of male and female students on the Total Score was not statistically significant. However on two of the content subscales (numbers & fractions), the performance of female students was statistically higher than the performance of male students, whereas the performance of boys on the measurement subscale was higher than the performance of girls. The order of performance on the content subscales was identical for both boys & girls. The order from highest to lowest is as follows: numbers, geometry, fractions, and measurement. Also noticeable was the large difference between the performance in numbers and measurement for both boys & girls (21 points difference in the case of male students and 30 points difference in the case of female students).

Table 24
Average Percent Correct Score, Standard Error and 95% Confidence Interval of Male & Female Students on the Math Test

	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score				
Males	53.74	16.70	.50	52.74–54.74
Females	54.89	15.9	.48	53.93–55.85
Content Subscales				
Numbers				
Males	62.21	20.7	.62	60.97–63.45
Females	65.40	20.1	.61	64.18–66.62
Fractions				
Males	50.06	21.80	.65	48.76–51.36
Females	52.90	21.00	.63	51.64–54.16
Geometry				
Males	51.26	21.6	.64	49.98–52.54
Females	53.17	21.3	.64	51.89–54.45
Measurement				
Males	41.15	21.7	.65	39.85–42.45
Females	35.93	19.9	.60	34.73–37.13
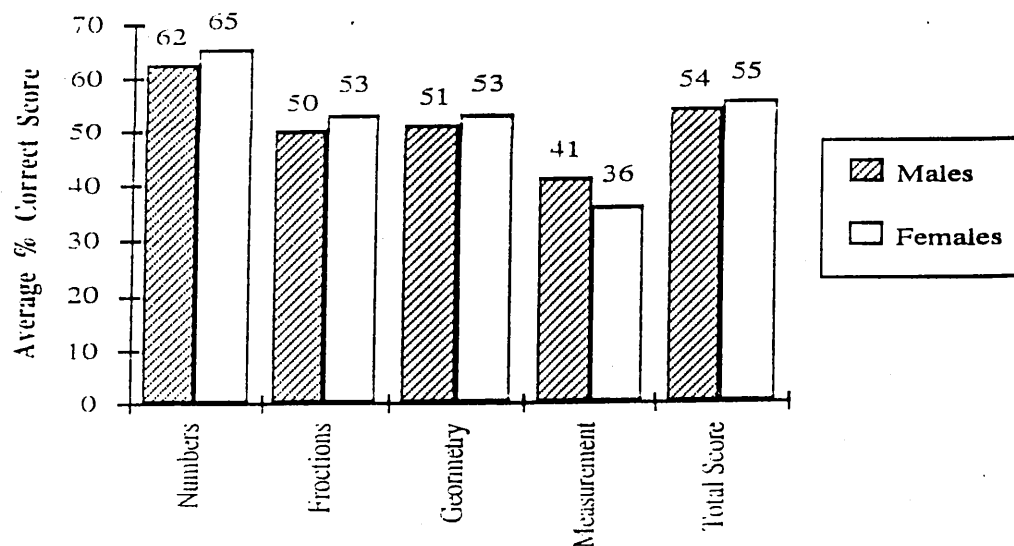
Figure (13)

Comparative Performance of Male and Female Students
on Various Content Subscales of the Math Test

Performance by Education Authority

Table (25) shows related statistics and Figure (14) gives a graphic display of the performance of fourth grade students on the Mathematics Test and its content subscales by education authority.

Table 25

Average Percent Correct Scores, Standard Error and 95% Confidence Interval on the Math Test Subscales in Each Education Authority

	Ministry of Education	Private Schools
Total Score		
Average % Correct	53.84	67.02
Standard Deviation	16.1	15.4
Standard Error	.35	1.75
95% CI	53.14–54.54	63.52–70.52
Content Subscales		
Numbers		
Average % Correct	63.27	77.75
Standard Deviation	20.4	16.3
Standard Error	.44	1.84
95% CI	62.39–64.15	74.07–81.43
Fractions		
Average % Correct	51.38	53.59
Standard Deviation	21.4	21.3
Standard Error	.46	2.41
95% CI	48.62–50.46	48.77–58.41
Geometry		
Average % Correct	51.70	65.90
Standard Deviation	21.3	20.3
Standard Error	.46	2.30
95% CI	50.78–52.62	61.30–70.50
Measurement		
Average % Correct	38.02	54.01
Standard Deviation	20.6	25.0
Standard Error	.45	2.83
5% CI	37.12–38.92	48.35–59.67
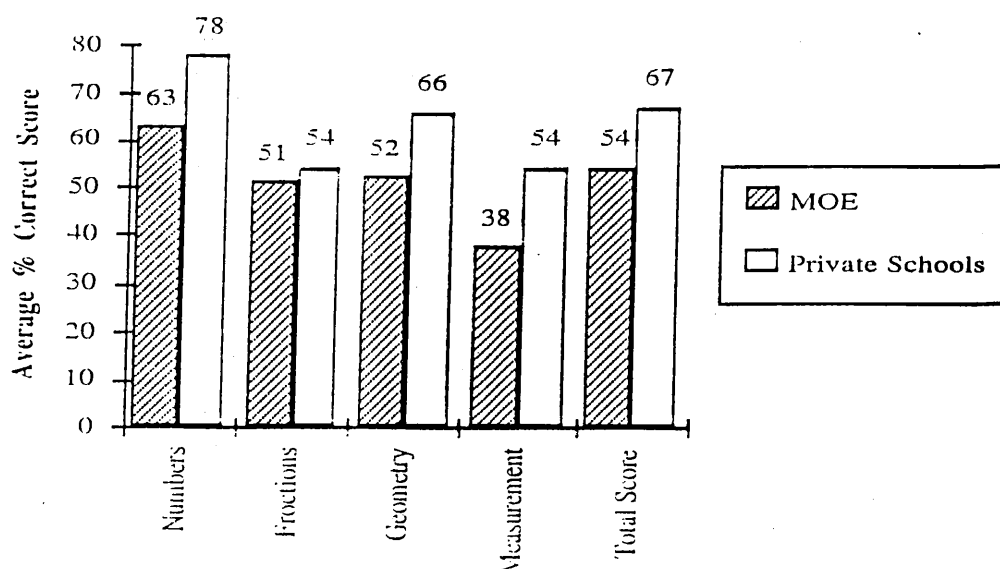
Figure (14)

Average Percent Correct Scores on the Math Test and
its subscales in Each Education Authority

Examination of Table (25) and Figure (14) clearly indicates that private school students scoral higher (α=.05) on the total score and all content subscales than Ministry of Education students. with a difference of approximately 14%. The highest performance for both authorities was on the numbers subscale. The lowest for MOE students was on the measurement subscale whereas the lowest for private school students on the fractions and measurement subscales.

Performance by School Location

Results presented in Table (26) and graphically displayed in Figure (15) show that neither the total score nor the performance on all content subscales was statistically significantly different for students in urban & rural schools. For both locations. the highest performance was on the numbers subscale and the lowest performance was on the measurement subscale. with a difference of 15%.

Table 26
Average Percent Correct Score, Standard Error and 95% Confidence Interval in Urban and Rural Schools

	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score				
Urban	55.43	16.2	.56	54.31–56.55
Rural	53.61	16.3	.44	52.73–54.49
Content Subscales				
Numbers				
Urban	65.12	19.6	.67	63.78–66.46
Rural	62.96	20.9	.56	61.84–64.08
Fractions				
Urban	51.83	20.7	.71	50.41–53.25
Rural	51.23	21.8	.59	50.05–52.41
Geometry				
Urban	53.56	20.9	.72	52.12–55.00
Rural	51.37	21.7	.59	50.19–52.55
Measurement				
Urban	39.41	22.4	.77	37.87–40.95
Rural	38.07	20.1	.54	36.99–39.15
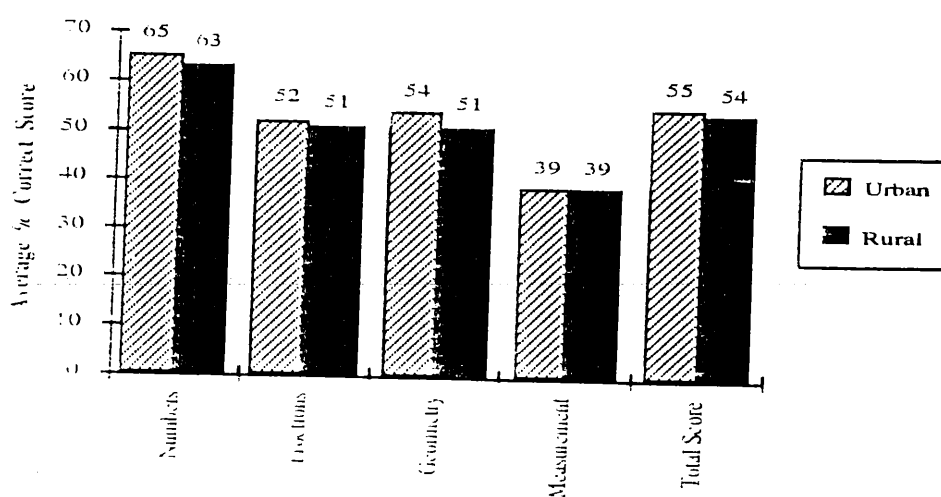
Figure (15)
Average Percent Correct Scores on the Math Test Subscales in Urban and Rural Schools

D. Life Skills Test
Performance at the National Level

The Life Skills Test was administered to 2.204 fourth grade students (1.111 males, and 1.093 Females) in the sampled schools.

Results indicated that the national average percent correct on the test was 48.31. Table (27) presents the average percent correct scores on the test and its subscales.

Table 27
Average Percent Correct Score on the Life Skills Test Subscales

Subscale	Average percent correct	Standard Deviation	Standard Error	Lower 10%		Upper 10%	
				Min	Max	Min	Max
Total Score	48.31	16.4	.35	10.20	28.57	71.43	93.88
Content							
Health & Nutrition	49.19	19.7	.42	.00	21.43	78.57	100.00
Environment	46.62	20.4	.44	.00	20.00	70.00	100.00
Civil Education	44.63	18.5	.39	.00	20.00	73.33	100.00
Daily Behavior	52.10	22.0	.47	.00	20.00	80.00	100.00
Skills							
Knowledge	45.22	15.2	.32	3.45	27.59	65.52	96.55
Application	51.69	21.5	.46	.00	20.00	80.00	100.00

In terms of content suoscales. results in Table (27) show that students' performance was the highest on the daily behavior subscale and the lowest on the civic education subscale. Unexpectedly, students' performance on the application-related items was higher than on knowledge-related items, with a difference of 6%. On almost all subscales. the performance of the lower 10% of students ranges from a minimum of 0 to a maximum of 21. For the upper 10% of students, the performance ranges from a minimum of 65.5 to a maximum of 100. A graphic presentation of the average percent correct scores on the Life Skills Test and its subscales is shown in Figure (16).
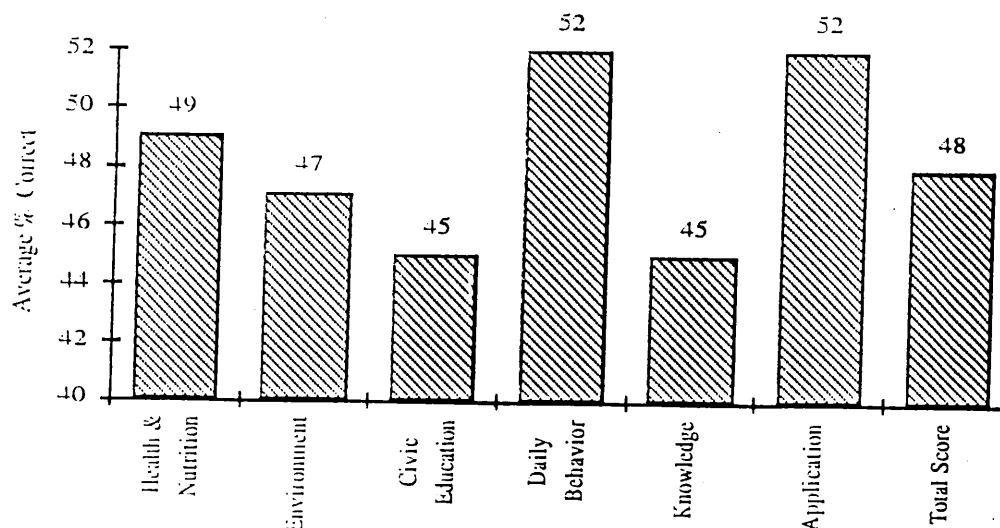
Figure (16)

Average Percent Correct Scores on the Life Skills Test Suscales

Performance by Region

Table (28) shows the average percent correct score in each region, while Figure (17) gives its graphic presentation.

Table 28

Average Percent Correct Score, Standard Error and 95% Confidence Interval On the Life Skills Test in Each Region

Region	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Muscat	48.15	15.8	1.02	46.11–50.19
North Batinah	44.43	17.3	.90	42.63–46.23
South Batinah	47.10	15.4	.89	45.32–48.88
Al-Dakhiliya	49.72	16.70	.91	47.90–51.54
South Sharqiya	53.27	14.4	1.08	51.11–55.43
North Sharqiya	41.33	12.7	.94	39.45–43.21
Al-Dhahira	51.18	16.9	1.07	49.04–53.32
Dhofar	52.34	15.1	1.12	50.10–54.58
Al-Wusta	37.21	20.2	2.84	31.53–42.89
Musandam	44.76	15.5	1.78	41.20–48.32
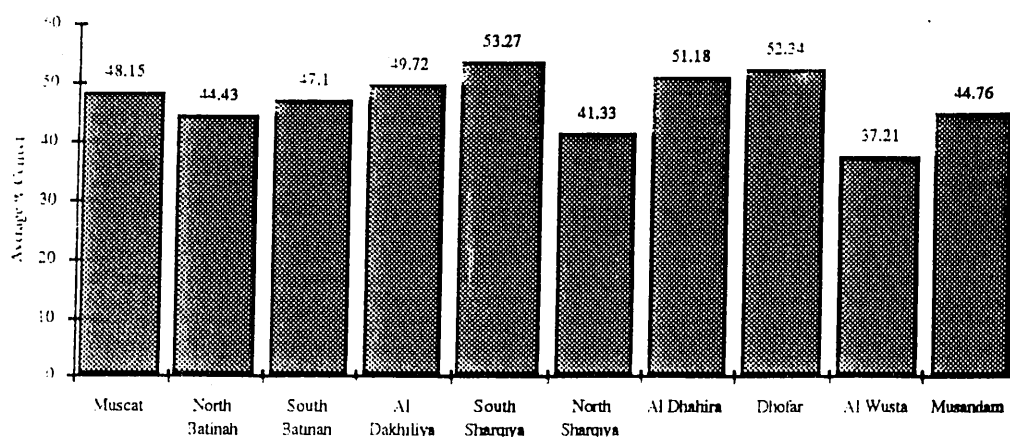
Figure (17)

Average Percent Correct Score on the Life Skills Test in Each Region

Results reveal that regions can be classified into three groups in terms of student performance on the Life Skills Test. The highest performing group inlcudes South Sharqiya, Dhofar, and Al Dhahira regions. The lowest performing group includes Alwusta, North Sharqiya, Musandam, and North Batinah regions. This trend is also noticed when we take levels of performance on content and skill subscales (Table 29). Moreover, in almost all regions student performance from highest to lowest was in the following order: daily behavior, health and nutrition, environment, and civic education except for Al Wusta where student performance was the lowest on the daily behavior subscale.

Table (29)
Average Percent Correct Score and Standard Error on the Life Skills Test Subscales in Each Region

	Muscat	North Batinan	South Batinan	Al-Dakhilia	South sharqiy	North sharqiy	Al Dhahira	Dhofar	Al-Wusta	Musandam
Total Score										
Average % Correct	48.15	44.43	47.10	49.72	53.27	41.33	51.18	52.34	52.34	44.76
Standard Deviation	15.84	17.26	15.42	16.69	14.38	16.69	16.91	15.06	15.06	15.50
Standard Error	1.02	0.90	0.89	0.91	1.08	0.94	1.07	1.12	1.12	1.78
Average % Correct	47.93	47.28	47.78	48.93	54.45	41.48	52.45	56.83	41.21	42.01
Standard Deviation	19.8	20.5	18.7	19.6	17.2	16.8	21.1	18.1	14.6	19
Standard Error	1.28	1.07	1.07	1.07	1.29	1.25	1.33	1.35	4.06	2.18
Environment										
Average % Correct	45.60	42.88	44.85	48.00	50.51	39.45	50.88	50.28	38.46	43.55
Standard Deviation	18.9	21.6	20.1	20.3	19.6	18	20.3	20.3	12.8	17.8
Standard Error	1.22	1.13	1.16	1.11	1.47	1.33	1.28	1.51	3.55	1.99
Civic Education										
Average % Correct	43.2	40.48	42.29	47.58	51.57	39.26	47.76	45.57	37.44	44.04
Standard Deviation	17.5	18.4	16.8	18.6	18.6	15.5	19	18.2	15.8	16.3
Standard Error	1.12	.96	97	1.02	1.39	1.15	1.20	1.36	4.37	2.09
Daily Behavior										
Average % Correct	55.44	46.52	53.10	53.04	55.84	43.54	53.59	56.72	27.69	48.82
Standard Deviation	22	23	21.8	22	21.9	17.8	20.7	20.7	15.9	21.7
Standard Error	1.42	1.20	.25	1.20	1.64	1.32	1.31	1.54	4.41	2.49
Skill Subscales										
Knowledge										
Average % Correct	45.81	42.21	43.71	46.17	49.63	38.85	47.03	48.97	36.60	42.97
Standard Deviation	14.3	1.9	14.7	15.8	13.5	11.5	15.5	15.1	10.8	12.9
Standard Error	.2	.3	1	.96	1.01	.95	.98	1.12	2.99	1.48
Application										
Average % Correct	49.90	46.73	50.76	53.52	58.01	43.65	56.57	56.42	36.92	46.32
Standard Deviation	21.4	22.4	19.7	21.7	20.9	18.6	21.6	18.9	13.2	22.5
Standard Error	1.38	1.17	.13	1.19	1.57	1.38	1.36	1.41	3.65	2.59

Gender Differences on Life Skills Test

Results presented in Table (30) and Figure (18) indicate that the total score of female students as well as performance on Health and Nutrition, Environment, Daily Behavior, Knowledge and Application subscales was statistically significantly higher (α =.05). than that of male students. with an average difference of 4%. The pattern of performance was the same for the male and female students. That is, for both girls and boys the highest performance was on the daily behavior subscale and the lowest was on the civil education subscale. Performance of both genders was higher on application items than on knowledge items.

Table 30
Average Percent Correct Score, Standard Error and 95% Confidence Interval of Male and Female Students on the Life Skills Test Subscales

	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score				
Males	46.29	16.2	.49	45.31–47.27
Females	50.36	16.3	.49	49.38–51.34
Content Subscales				
Health & Nutrition				
Males	46.23	19.4	.58	45.07–47.39
Females	52.20	19.7	.59	51.02–53.38
Environment				
Males	44.71	20.3	.61	43.49–45.93
Females	48.57	20.5	.62	47.33–49.81
Civil Education				
Males	44.32	18.7	.56	43.20–45.44
Females	44.95	18.3	.55	43.85–46.05
Daily Behavior				
Males	49.46	22.4	.67	48.12–50.80
Females	54.78	21.2		53.50–56.06
Skills				
Knowledge				
Males	44.01	15	.5	43.11—4.91
Females	46.46	15.3	.46	45.54—7.38
Application				
Males	48.88	21.5	.65	47.58–50.18
Females	54.56	21.2	.64	53.28–55.84
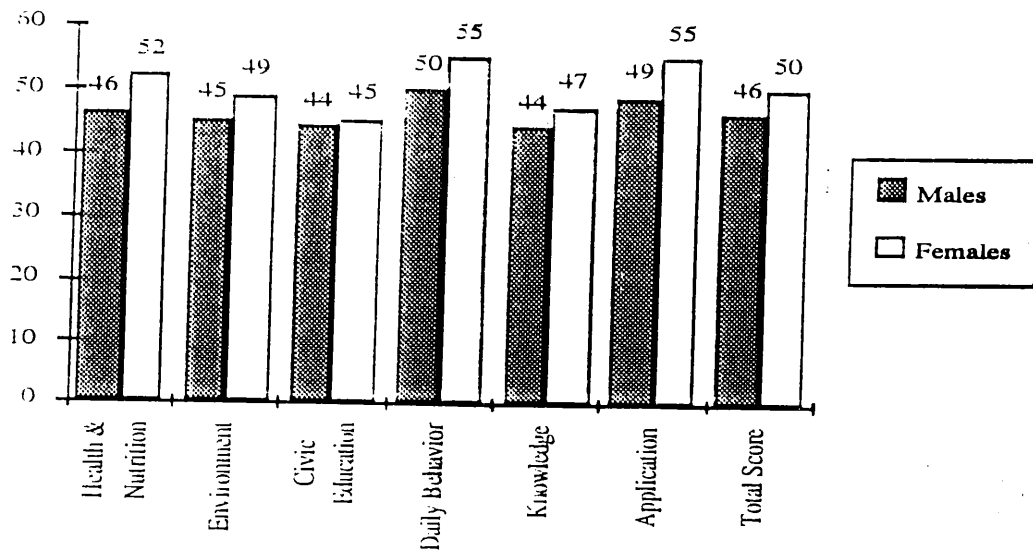
Figure (18)

Comparative Performance of Male and Female Students
on Various Subscales of the Life Skills Test

Performance by Education Authority

. Table (31) presents related statistics and Figure (19) gives a graphic display of the performance of fourth grade students on the Life Skills Test and its subscales by education authority.

Table 31
Average Percent Correct Scores, Standard Error and 95% Confidence Interval on the Life Skills Test in Each Education Authority

	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score				
MOE	47.98	16.2	.35	47.28–48.68
Private	57.40	17.7	2.01	53.38–61.42
Content Subscales				
Health & Nutrition				
MOE	48.99	19.7	.43	48.13–49.85
Private	54.85	21.2	2.41	50.03–59.67
Environment				
MOE	46.19	20.3	.44	45.31–47.97
Private	58.46	22.2	2.51	53.44–63.48
Civic Education				
MOE	44.31	18.3	.40	43.51–45.11
Private	53.33	22	2.49	48.35–58.31
Daily Behavior				
MOE	51.69	21.9	.48	50.73–52.65
Private	63.33	20.6	2.33	58.67–67.99
Skills				
Knowledge				
MOE	44.92	15	.33	44.26–45.58
Private	53.40	16.9	1.91	49.58–57.22
Application				
MOE	51.32	21.4	.46	50.40–52.24
Private	61.86	23.1	2.61	56.64–67.08
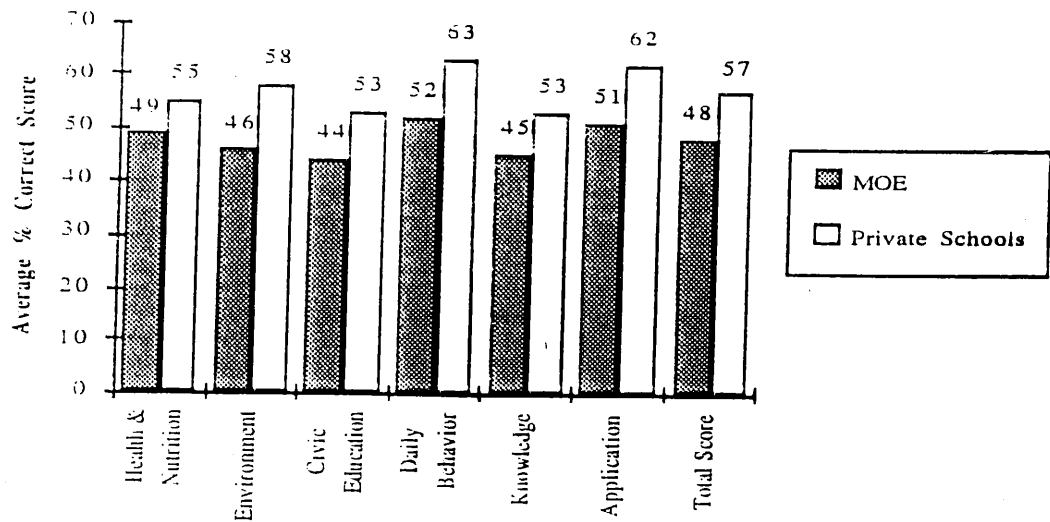
Figure (19)

**Average Percent Correct Scores on the Life Skills Test
in Each Educational Authority**

Results given in Table (31) and Figure (19) clearly indicate that private school students outperformed Ministry of Education students on the Life Skills Test and its content and skill subscales, with a difference of approximately 9%. The highest performance for both authorities was on the daily behavior subscale and the lowest was on the civic education subscale. In both authorities, performance on application related items was higher than their performance on knowledge items.

Performance by School Location

Table (32) and Figure (20) present the performance of fourth grade students on the Life Skills Test and its subscales in urban and rural schools.

Table 32
Average Percent Correct Scores on the Life Skills Test Subscales in Urban and Rural Schools

Location	Average % correct	Standard Deviation	Standard Error	95% Confidence Interval
Total Score				
Urban	49.15	16.7	.58	47.99–50.31
Rural	47.79	16.1	.44	46.91–48.67
Content Subscales				
Health & Nutrition				
Urban	49.30	20.3	.70	47.90–50.70
Rural	49.13	19.4	.52	48.09–50.17
Environment				
Urban	48.04	20.7	.71	46.62–49.46
Rural	45.75	20.3	.55	44.65–46.85
Civic Education				
Urban	44.85	18.8	.65	43.55–46.15
Rural	44.49	18.3	.50	43.49–45.49
Daily Behavior				
Urban	54.07	22	.76	52.55–55.59
Rural	50.89	21.9	.59	49.71–52.07
Skills				
Knowledge				
Urban	45.88	15.2	.52	44.84–46.92
Rural	44.82	15.2	.41	44.00–45.64
Application				
Urban	52.68	22.4	.77	51.14–54.22
Rural	51.09	21	.57	49.95–52.22
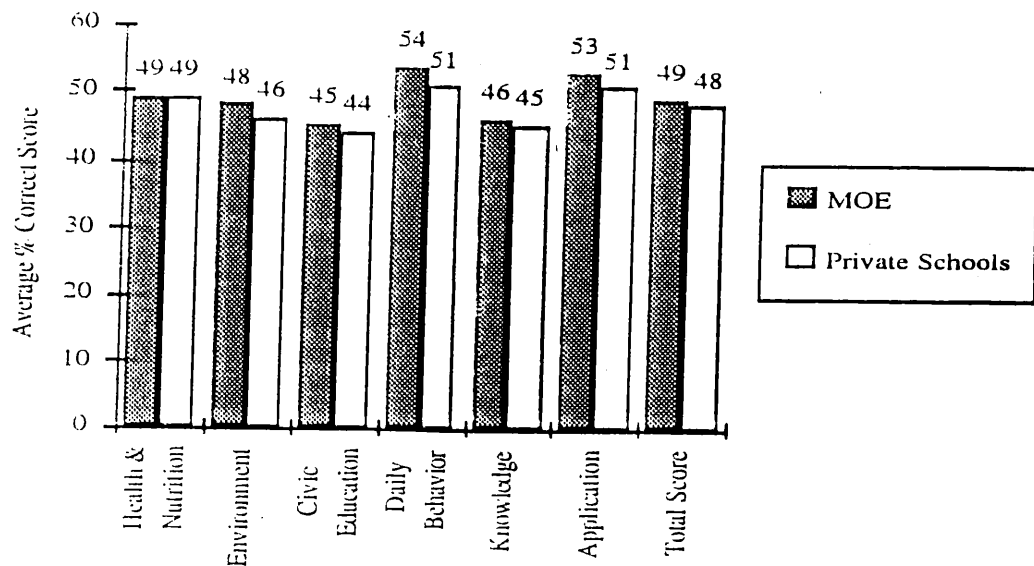
Figure (20)

**Average Percent Correct Scores on the Life Skills Test
and its Subscales in Urban and Rural Schools**

It can be seen from Table (32) and Figure (20) that the performance of urban school students on the life skills test as a whole and on its subscales is not statistically significantly different than that of rural school students. Urban school students, however, performed statistically significantly higher on daily behavior items than rural school students. Moreover, the performance of both urban and rural students was the highest in daily behavior and the lowest in civic education. Students of both locations scored higher on application items compared to their performance on knowledge items.

II. RELATIONSHIPS BETWEEN STUDENT ACHIEVEMENT AND STUDENT, PARENT, TEACHER, AND SCHOOL (PRINCIPAL) VARIABLES

A. Student and Family Variables

This section discusses the relationship between and selected variables included in the student and parentl questionnaire (performance on the three achievement tests).

Number of Books (Stories) Read in a Month.

Table (33) presents the means and related statistics on the Arabic Language Test for different groups responding to the question of how many books or stories the child reads in a month.

Table (33)
Arabic Language Means by Number of Books

Group	Average correct	Standard deviation	Standard error
1 None	44.97	21.45	2.77
2 One book	56.11	20.23	1.18
3 Two books	54.94	21.27	1.40
4 Three books	55.49	19.70	1.15
5 More than 3 books	58.85	19.77	.54

* $F_{2,193}=9.29$. p<.001. SNK post-hoc. reveals that group 5 outperformed all other groups significantly and groups 2, 4, 3 outperformed group 1 significantly.

Tables 34&35 also present average percent correct on Mathematics and Science tests for the five groups of respondents according to number of books read in a month.

Table (34)
Math Means by Number of Books

Group	Average correct	Standard deviation	Standard error
1 None	43.92	14.93	1.93
2 One book	54.33	16.59	.96
3 Two books	51.93	16.16	1.06
4 Three books	52.63	15.84	.93
5 More than 3 books	55.51	16.15	.44

* $F_{2,295}=10.11$. p<.001/SNK reveals that group 5 outperformed groups 1,3,4 and groups 2,4,3 outperformed group 1.

<div align="center">

Table (35)

Science Means by Number of Books

</div>

Group	Average correct	Standard deviation	Standard error
1 None	39.41	17.91	2.31
2 One book	46.69	16.95	.99
3 Two books	46.87	18.89	1.24
4 Three books	47.61	17.42	1.02
5 More than 3 books	49.84	18.44	.51

$_4F_{2196}=6.94$. $p<.001$. SNK reveals that group 5 significantly outperformed groups 1 and 2, and that groups 4,3 and 2 outperformed group 1.

A graphical presentation of the relationship between number of books the child reads in a month and his/her score on Arabic, Math and Science Tests is shown in figure(21).

<div align="center">
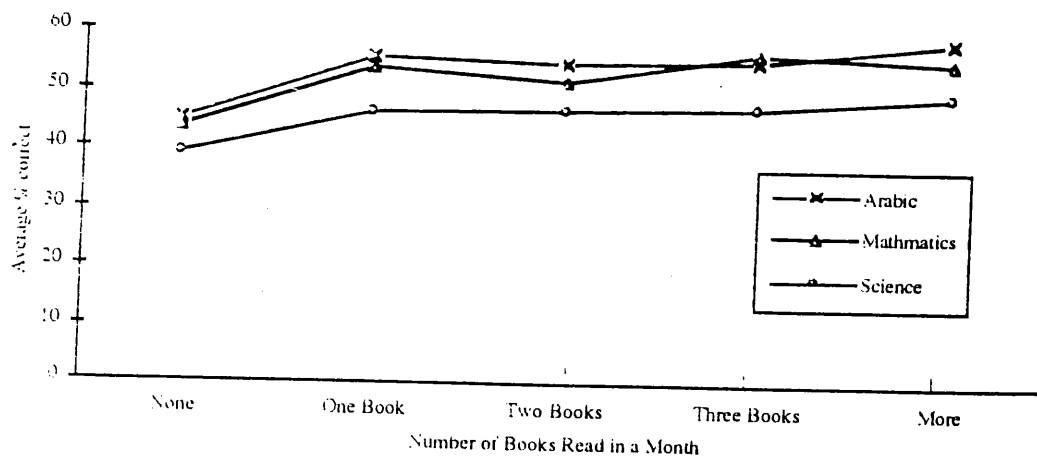
Figure (21)

Average Percent Correct Score by Number of Books Read in Month

</div>

It can be seen from graph (21), that students scores on all tests increase as the number of books or stories they read increase.

Household Size

Household size ranged up to 28 people, with 50% of the households having 9 or more persons. When coupled with the fact that most children live with two parents (90%), the data indicate the continuance of the

traditional extended family pattern in which most Omani children are still raised. Results in Tables (36) and Figure (22) indicate an inverse relationship between household size and students achievement (This relationship is statistically significant for Math and Science scores).

Table (36)
Means by Household Size

Household Size	Average	Standard deviation	Standard error
group (1) ≤5			
Arabic	58.94	21.84	2.06
Math	55.72	17.54	1.64
Science	51.91	20.2	1.90
group (2) 6-10			
Arabic	59.10	20.05	.63
Math	54.78	16.27	.5
Science	49.19	18.4	.57
group (3) 11-15			
Arabic	56.97	20.02	.73
Math	54.57	16.29	.59
Science	48.70	18.04	.66
group (4) ≥16			
Arabic	57.87	20.1	1.34
Math	50.78	15.43	1.03
Science	44.25	16.8	1.12

$F_{2106} = 1.91$ p>.05 (Arabic achievement)

$F_{2117} = 4.15$ p<.01/SNK= 1>4. 2>4. 3>4 (Math achievement)

$F_{2113} = 5.84$ p<.01/SNK= ..4. 2>4. 3>4 (Science achievement)
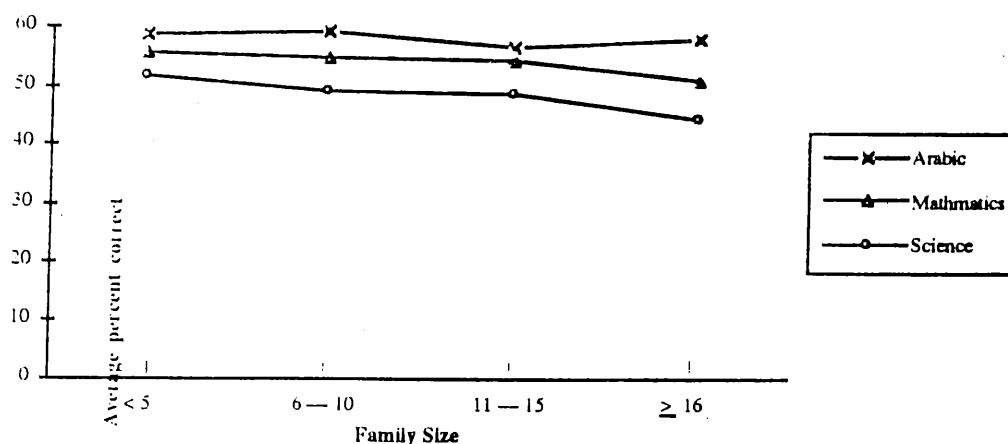
Figure (22)

Achievement by Family Size

Presence of Both Parents at Home

Omani children appear to have one of the world's highest rates of both parents in home. Over 96% of students have their mothers at home, while over 95% have a father at home. Results (Tables 37&38) indicate that the presence of the father and mother makes no difference in student achievement with the exception that students whose mothers live in the same house performed better on the Arabic Language Test than those whose mothers do not live in the same house.

Table (37)
Does the Father Live in the Same House?

Group	Count	Average correct	Standard deviation	Standard error	T-value
Arabic Test					
No	126	57.72	20.7	1.8	
Yes	2026	57.14	20.17	.44	.31
Math Test					
No		54.54	15.50	1.35	
Yes		54.17	16.36	.36	.26
Science Test					
No		48.18	16.72	1.49	
Yes		48.46	18.38	.41	—.18

Table (38)
Does the Mother Live in the Same House?

Group	Count	Average correct	Standard deviation	Standard error	T-value
Arabic Test					
No	80	52.80	18.84	2.1	
					—2.12*
Yes	2071	57.36	20.2	.44	
Math Test					
No		52.90	14.73	1.64	
					—.81
˙˙es		54.26	16.38	.36	
Science Test					
No		47.13	17.7	1.98	
					—.67
Yes		48.49	18.31	.40	

*   p<.05

Family Income

Income amount ranges from 50 RO to 5000. RO. with 50% of the sampled children from families whose income is more than RO200. In most cases. students from higher income families achieved significantly higher. except those with more than 2.000RO whose achievement was not statistically different on math and science. (Table 39 & Figure 23)

Table (39)
Achievement Means Income Bracket

Income Amount	Average	Standard deviation	Standard error
Arabic Test			
(1) ≤ 300	55.84	19.67	.54
(2) 301—600	61.33	21.32	1.19
(3) 601—1000	67.70	20.59	2.22
(4) 1001—2000	70.55	16.76	3.29
(5) >2000	74.87	20.24	6.14

$F_{1720}= 15.31$ p<.001/SNK= 5>1, 4>1, 3>1, 2>1.

Income Amount	Average	Standard deviation	Standard error
Math Test			
(1) ≤ 300	53.26	15.80	.44
(2) 301—600	56.40	17.88	.99
(3) 601—1000	64.65	16.72	1.79
(4) 1001—2000	64.04	18.60	3.65
(5) > 2000	57.70	13.25	4.19

$F_{1728}= 13.74$ p<.001/SNK= 3>1, 2, 4>1, 2>1.

Income Amount	Average	Standard deviation	Standard error
Science Test			
(1) ≤ 300	47.58	17.3	.48
(2) 301—600	51.50	20.28	1.13
(3) 601—1000	59.74	20.84	2.24
(4) 1001—2000	59.13	19.80	3.88
(5) > 2000	46.46	19.98	6.32

$F_{1721}= 13.10$ p<.001/SNK= 3>1, 2, 4>1, 2, 2>1.
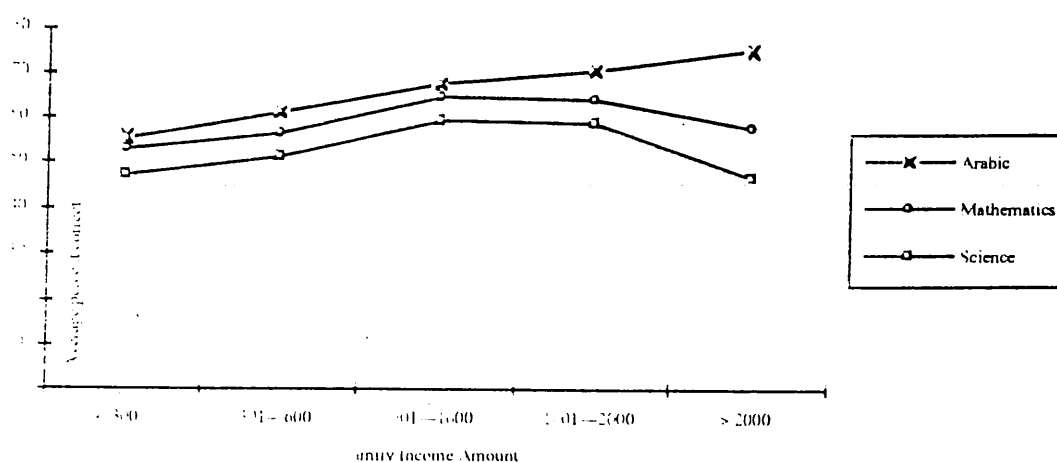
Figure (23)

Achievement v Income Bracket

Parental Education

Among women, 70% of the parent population of 4th grade students are illiterate while among the men the percentage is 35%. When college and university education is considered, only 6% of fathers and 3% of mothers have this level of education. Both fathers' and mothers' education are directly related to their children's academic achievement.

Table (40)
Achievement Means by Father's Level of Education

Level of Education	Average correct	Standard deviation	Standard error
(1) Illiterate			
Arabic	53.19	19.05	.77
Math	51.25	16.19	.60
Science	46.02	16.98	.63
(2) Primary Ed.			
Arabic	57.01	20.17	.66
Math	54.20	15.79	.52
Science	47.70	17.97	.59
(3) Secondary Ed.			
Arabic	63.37	19.16	1.17
Math	57.77	15.1	.92
Science	52.91	18.87	1.15
(4) Diploma (2-year post-secondary)			
Arabic	65.78	21.88	3.3
Math	63.1	18.55	2.8
Science	60.17	23.55	3.59
(5) University Ed.			
Arabic	60.67	20.89	2.39
Math	63.96	18.97	2.16
Science	60.63	21.47	2.44

- F_{2014} = 23.49, p<.001/SNK= 5>.2.3, 4>1.2, 3>.2, 2>1 (Arabic scores).
- F_{2024} = 19.80, p<.001/SNK= 5>1 2.3 4>1.2.3 3>1.2 2>1 (Math scores).
- F_{2020} = 19.70 p<.001/SNK= 4>1.2.3 5>1.2.3 3>1.2. (Science Scores).

Table (41)
Achievement Means by Mother's Level of Education

Level of Education	Average correct	Standard deviation	Standard error
(1) Illiterate			
Arabic	54.96	19.51	.51
Math	52.44	15.72	.41
Science	46.57	17.42	.46
(2) Primary Ed.			
Arabic	60.84	20.27	.95
Math	56.36	16.30	.76
Science	50.89	17.80	.84
(3) Secondary Ed.			
Arabic	)8.05	19.53	1.84
Math	63.10	17.5	1.64
Science	62.66	19.56	1.87
(4) Diploma (2-year post-secondary)			
Arabic	62.67	22.14	3.85
Math	61.97	18.48	3.2
Science	54.61	24.52	4.27
(5) University Ed.			
Arabic	72.12	23.87	4.15
Math	62.94	21.44	3.68
Science	61.20	22.27	3.82

- $_4F_{2054} = 22.17$ p<.001/SNK= 5>1.2 3>1.2 2>1 (Arabic scores).
- $_4F_{2065} = 19.42$ p<.001/SNK= 3>1.2 5>1 2>1 (Math scores).
- $_4F_{2065} = 29.27$ p<.001/SNK= 3>1.2 5>1.2 4>1 2>1 (Science scores).
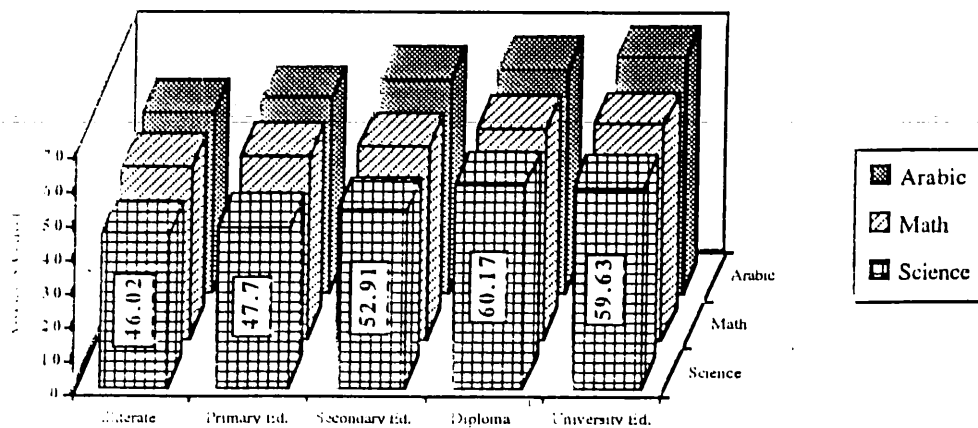
Figure (24)

Achievement by Father's Level of Education
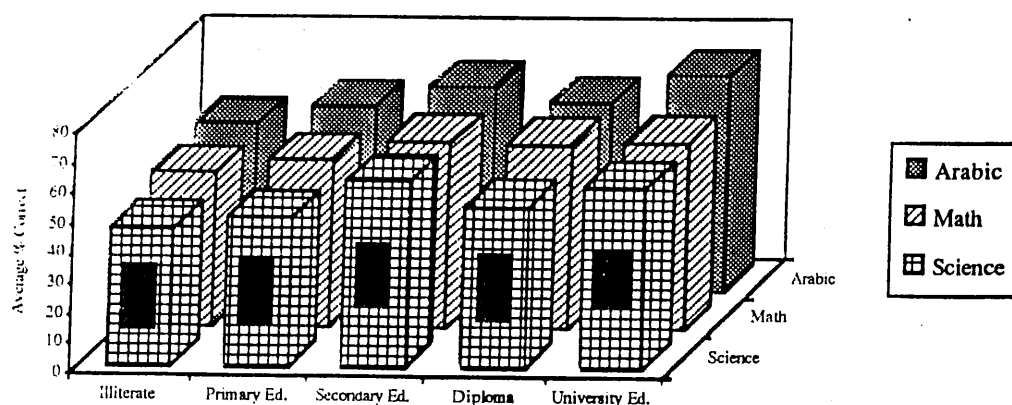
Figure (25)
Achievement by Mother's Level of Education

Parental Academic Aspirations (for Children)

Eighty-three percent of parents wished for their child to have university education. while 9% and 7.5% wished for them secondary and preparatory education. respectively. In terms of relationship between parental aspirations for their children and children's performance, results showed (Table 24 and Figure 25) that children whose parents have high academic aspirations for them scored higher on all tests.

Table (42)
Achievement Means by Level of Parental Aspirations

Level of Aspiration	Average	Standard deviation	Standard error
Arabic Scores			
(1) Preparatory	49.73	17.94	1.3
(2) Secondary	54.68	17.53	1.4
(3) University	58.02	20.02	.68
(4) Graduate	58.54	20.71	.69
Math Scores			
(1) Preparatory	50.1	14.90	1.07
(2) Secondary	51.9	14.98	1.19
(3) University	53.68	16.18	.54
(4) Graduate	56.28	16.60	.55
Science Scores			
(1) Preparatory	41.90	16.17	1.17
(2) Secondary	44.99	16.19	1.29
(3) University	48.78	17.67	.59
(4) Graduate	50.26	19.23	.64

- $F_{2110} = 11.59$ p<.001/SNK= 4>1 3>1 2>1 (Arabic scores)
- $F_{2110} = 11.1$ p<.001/SNK= 4>1.2.3 3>1 (Math scores).
- $F_{2110} = 13.3$ p<.001/SNK= 4>1.2 3>1.2 (Science scores).

Home Factors Affecting Students Achievement

The parent questionnaire included several items covering areas related to socio-economic status, availability of home facilities (electricity, tap water, TV. etc.), parental academic aspirations for their child, parental reactions to success and future of their children, parental monitoring mechanisms for their children's learning, and availability of academic assistance to children at home.

In order to identify the relative contribution of parental factors to students' achievement, a series of procedures was utilized:

a. each item was studied independently in terms of its statistical properties. Only those items which have reasonable variation and do not have large missing percentages (less than 10% of the sample) were kept.

b. The matrix of correlation coefficients of these variable items and student achievement in Arabic, Math and Science was carefully investigated. Only those items which show significant relationship with academic achievement were maintained for further analysis.

c. New variables were created either by simple grouping of related items or by factor analysis of scales or items.

d. By applying these rules, only twelve factors were identified and their relationship with student performance on each of the three tests (Arabic Language, Math and Science) was investigated and then entered into a series of multiple regression analyses to identify the relative contribution of each or a group of factors in accounting for variations in students achievement. Annex 1 presents a list of these factors and their composition.

1. Home Factors Affecting Achievement in Arabic

Table (43) presents the results of the multiple regression analysis of students achievement scores in Arabic Language on parent/factors.

Table (43)
Proportion of Explained Variance of Students' Scores on the Arabic Language Test

Factor	Simple correlation	Beta coefficients by steps*									
		1	2	3	4	5	6	7	8	9	10
1. SES	.310	.265	.265	.227	.217	.21	.204	.20	.20	.20	.20
2. Family Size	-.05										
3. Enrolment years in School	-.22			0.15	0.15	-.146	-.14	-.14	-.14	-.14	-.14
4. Availability of facilities at home.	.11				.057	.046					
5. Parents' aspiration for the child.	.16					.12	.106	.10	.094	.096	.096
6. Availability of private tutor.	-.15						-.08	-.08	-.07	-.07	-.07
7. Daily follow up of students' work	.15							.056	.051	.05	.05
8. Attribution of success to internal factors.	.12								.08	.09	.09
9. Reacting to failure by punishment.	-.10									-.059	-.05
10. No. of hours watching TV.	-.05										
11. No. of hours playing.											-.08
R		.265	.265	.302	.31	.33	.34	.346	.356	.363	.376
R2		.70	.71	.092	.095	.101	.116	.12	.127	.132	.141

* Variables are entered in blocks and only statistically significant Beta values were reported (p<.05).

Table (43) shows that factors such as represented by a factor composed of family income, mother's education and father's education, availability of modern facilities at home, parents' academic aspirations for the child, daily follow-up of students work and attribution of students' success to internal factors (ability and effort) correlate significantly (positively) with student performance on Arabic Test. Other

factors such as household size, number of years the child was enrolled in the school (an index of repetition), availability of private tutoring (whether the child has a private tutor), parental reprimand of student's failure, number of hours the child watches TV daily and number of hours the child plays outside home correlate negatively (p<.05) with student performance on the Arabic Test.

It is also clear from the table that all parental factors included in the model accounted only for **14% of the deviation in students' scores** on the Arabic Language Test. **Half of this** explained variance is accounted for by the socio-economic **status of the** child's family (this **factor** represents a factor score of three variables including income amount, and father and mothers level of education). Other factors explained a small, but significant, proportion of variation in Arabic achievement.

2. Parent/Family Factors Affecting Achievement in Mathematics

Table (44) presents the results of the multiple regression analysis of students achievement scores in Mathematics on parental factors.

Table (44)
Percent of Explained Variance of Students Scores on Math Test.

Factor	Simple Correlation	Beta coefficients by steps*									
		1	2	3	4	5	6	7	8	9	10
1. SES	.270	.24	.24	.203	.206	.198	.193	.19	.19	.19	.19
2. Family Size	—										
3. Enrolment years in School	-.20			-.14	0.14	-.14	-.138	-.137	-.139	-.136	-.135
4. Availability of facilities at home.	—			—	—						
5. Family aspiration for the child.	.15					.125	.110	.11	.10	.10	.10
6. Availability of private Tutor.	.12						-.07	-.06	-.05	-.05	-.05
7. Daily follow up of students work	.13							.05	.05	.05	.05
8. Attribution of success to internal factors.	.0									.04	.04
9. Reacting to failure by punishment.	.07									—	—
10. No. of hours watching TV.	—									—	—
11. No. of hours playing.	—										—
	.21	.24	.24	.274	.274	.11	.309	.316	.32	.322	.326
	.22	.05	.05	.05	.05	.2	.05	.10	.102	.104	.106

* Variables are entered in blocks and only statistically significant Beta values were reported (p<.05).

Table (44) shows that around 11% of the variation in math scores could be accounted for by parental factors. 50% of this explained variance is accounted for by SES.

3. Parents/Family Factors Affecting Achievement in Science.

Table (45) presents the results of the multiple regression analysis of science scores on parental factors.

Table (45)
Proportion of Explained Variance in Science Scores

Factor	Simple Correlation	Beta coefficients by steps*									
		1	2	3	4	5	6	7	8	9	10
1. SES	.29	.255	.251	.214	.205	.195	.191	.189	.189	.189	.190
2. Family Size	-.07	—	—	—	—	—	—	—	—	—	—
3. Enrolment years in School	-.22			-.146	-.144	-.14	-.14	-.139	-.14	-.138	-.137
4. Availability of facilities at home.	.10				.05	.04					
5. Family aspiration for the child.	.17					.139	.126	.119	.11	.11	.11
6. Availability of private tutor.	-.14						-.076	-.06	-.06	-.05	-.05
7. Daily follow-up of students' work	.16							.07	.06	.07	.06
8. Attribution of success to internal factors.	.08								.05	.06	.06
9. Reacting to failure by panishment.	-.07									-.04	—
10. No. of hours watching TV.	—									—	—
11. No. of hours p...ving.	-.06										-.05
R		.255	.257	.293	.297	.328	.336	.345	.349	.353	.359
R2		.065	.066	.086	.088	.107	.113	.119	.122	.125	.129

* Variables are entered in blocks and only statistically significant Beta values were reported (p<.05).

Inspection of Table (45) reveals that parental variables such as SES, availability of house facilities, academic aspirations, daily follow-up of students work associated positively (p<.05) with science scores. Other factors associated negatively with student performance on the science test. It is also clear that those parental factors included in the model accounted for 12.9% of the variation in science scores, with 50% of the explained variance is accounted for by SES. Parents' academic aspirations for the child also appear to be a significant predictor of students' level of performance on the Science Test.

Students' (Factors, Gender,Perceptions and Attitudes) as Related to Their Academic Achievement

The Student Questionnaire includes different items/variables related to their perceptions and attitudes toward themselves, their teachers and their schools. It also distinguistes students by gender. Preliminary analysis included careful investigation of each item (variation and missing values), correlation coefficients with academic achievement, and derivation of factors. All derived factors from student questionnaires that show a significant relationship with academic achievement were then entered into a series of multiple regression analyses to determine their relative contribution to students' levels of achievement in each subject separately.

1. Factors Affecting Achievement in Arabic Language.

Table (46) presents the results of the multiple regression analysis of Arabic Language scores on student-related Factors.

Table (46)
Proportion of Explained Variance in Arabic Language Scores

Factor	Correlation Coefficients	Beta Coefficients by Step*				
		1	2	3	4	5
1. Student gender	-.17	-.17	-.16	-.12	-.11	-.11
2. Interest strength in school	.10		.08	.08		
3. Inclination towards reading books.	.11		.10	.08	.05	.05
4. Physical classroom environment.	.08			.07		
5. Attribution of failure to lack of interest.	-.29			-.29	-.23	-.23
6. Attribution of failure to test difficulty..	-.21			-.15	-.1.	-.20
7. Attribution of success to external factors.	-.06			-.08	-.07	-.07
8. Clarity of presentation of Material.	.20				.18	.17
9. Unrealistic teacher expectations.	-.28				-.19	-.19
10. Teacher usage of punishment.	-.17				-.08	-.08
11. Perception of tasks difficulty.	.10					
12. Diversity of assessment procedures.	.10				.05	.05
13. Frequency of visits by the principal to class.	-.11					
14. Opportunity to learn in case of Teacher Absenteeism.	.07					.06
R		.17	.22	.42	.49	.497
R2		.030	.048	.175	.242	.247

- All correlation coefficients are significant at p<.01.
- Beta coefficients were reported only for factors with statistical significant values at p<.05
- Student gender is coded as Males=1 and Females=0.

It is clear from Table (46) that female students outperformed male students and that clarity of teachers' instruction, inclination toward reading books and stories, inclination toward schools, diversity of assessment tools and positiveness of physical classroom environment and school tendency to preserve opportunities to learn correlate positively (p<.05) with students performance on the Arabic Test. Other factors such as external attribution of failure, unrealistic teacher expectations, utilization of punishment in the classroom, and principals' visits to the classroom correlate negatively with achievement in Arabic Language.

Results also show that factors related to students' perceptions of themselves, their teachers and schools account for about 25% of the overall variation in students achievement in Arabic Language. In the final analysis, factors related to students' attribution style emerged to be the strongest predictors of student achievement, followed by students' perceptions of teaching practices.

2. Factors Affecting Achievement in Mathematics.

Table (47) presents the results of the multiple regression analysis of students scores in mathematics on factor related to students' attitudes toward themselves, their teachers and schools.

Table (47)
Proportion of Explained Variance in Mathematics Scores

Factor	Correlation Coefficients	Beta Coefficients by Step*					
		1	2	3	4	5	6
1. Student gender	±.05	.05					
2. Interest strength in school	.14*		.13	.15	.15	.09	.09
3. Inclination towards reading books.	.09*		.08	.06	.06		
4. Attribution of failure to lack of interest.	-.25*			-.25	-.25	-.21	-.21
5. Attribution of failure to test difficulty..	-.16*			-.16	-.16	-.13	-.13
6. Attribution of success to external factors.	-.05*			-.06	-.06	-.04	-.04
7. Physical environment of class.	.04						
8. Clarity of presentation of Material.	-.19*					-.17	-.16
9. Unrealistic teacher expectations.	-.??*					-.15	-.15
10. Acceptance of students.							
11. Teacher usage of punishment.	-.08*						
12. Limited involvement of students in class activities	-.11*					-.07	-.07
13. Perception of task difficulty.	-.04						
14. Diversity of assessment procedures.	-.10*					.06	.06
15. Frequency of visits by the principal to class.	-.10*						
16. Opportunity to learn in case of Teacher Absenteeism.	.06*						.06
R		.05	.16	.34	.34	.41	.42
R2		.025	.268	.118	.118	.169	.172

*   p<.05
-    Only significant Beta coefficients were reported.
-    Factors are entered in blocks.

As in the case of Arabic Language scores, students' inclination towards schools and extra reading activities, and clarity of the teacher presentation of the lesson correlate positively with their scores in mathematics. Factors such as attribution of failure to lack of interest or test difficulty, and unrealistic expectations on the part of the teachers for their students abilities, and limited involvement of students in classroom activities correlate negatively with levels of achievement in mathematics.

In the final model, student-related factors account for 17.2% of the overall variation in their mathematics scores. Apparently, factors related to attribution of failure and students' assessment of their teachers efficacy account for 85% of this explained variance.

3. Factors Affecting Achievement in Science.

Table (46) presents the results of the multiple regression analysis of Science scores on students, related factors.

Table (48)
Proportion of Explained Variance in Science Scores

Factor	Correlation Coefficients	Beta Coefficients by Step*					
		1	2	3	4	5	6
1. Student gender.	-.07*	-.07	-.06				
2. Inclination towards school.	.11*		.10	.13	.12	.09	.09
3. Inclination towards reading books.	.11*		.10	.09	.08	.05	.05
4. Attribution of failure to lack of interest.	-.28*			-.28	-.28	-.24	-.24
5. Attribution of failure to test difficulty.	-.17*			-.17	-.17	-.12	-.12
6. Attribution of success to external factors.	-.09*			-.10	-.10	-.09	-.09
7. Physical environment of class.	.04						
8. Clarity of material presentation.	.15*					.13	.13
9. Acceptance of students.	.09*					.08	.08
10. Unrealistic teacher expectations	-.28*					-.16	-.16
11. Teacher usage of punishment.	-.07*						
12. Perception of tasks difficulty.	.15*						
13. Diversity of assessment tools.	.10*					.08	.08
14. Frequency of principal visits to class.	-.08*						
	R	.07	.16	.38	.55	.45	.45
	R2	.004	.026	.144	.144	.203	.203

* p<.05
- Only significant Beta coefficients were reported.
- Student gender in coded as 1= Males, 0= Females.
- Factors are entered in blocks.

As clearly shown in Table (48), students' inclination towards schools and reading books or stories, clarity of teachers' presentation of material, teachers' unconditional positive regards of students, and multiple assessment procedures of learning outcomes correlate positively with students' achievement in science. On the other hand, external attribution styles of success and failure, and unrealistic teacher expectations of students' ability to learn correlate negatively with performance on the science test. In the final model of the regression analysis, all student-related factors accounted for 20% of the variation in science scores. Almost all of this explained variance could be accounted for by attribution styles and students' perceptions of their teachers' effectiveness.

B. Teacher-Related Factors Affecting Student Achievement

The teacher questionnaire contained a large number of items measuring a wide range of domains including gender, qualifications, experience in teaching, teaching load, attitude toward the teaching profession, expectation of students' achievement motivation, teachers' attribution to students' failure, perceived self-efficacy, teaching strategies, class size, number of supervision visits, and outside school of the teachers or students? etc.

In order to derive meaningful factors from this large number of items, related items were grouped and one factor was derived, or related subscales were factorally analyzed. Annex 1 shows those derived factors which were further investigated to determine the relative contribution of teacher-related factors to their students' achievement. It is worth mentioning here that this analysis was conducted separately for each achievement test. That is, Arabic Language teacher-related factors were investigated in relation to students' achievement in Arabic language, and factors related to science teachers were investigated in relation to students' scores on the Science tests, and finally, factors related to Mathematics teachers were investigated in relation to students' achievement in Math.

1. Factors Affecting Achievement in Arabic

To determine which factors associated with Arabic Language teachers affect their students' achievement in Arabic Language, the

correlation matrix was investigated and only those meaningful factors were entered into a series of multiple regression analyses. Table (49) shows the results of the multiple regression analysis.

Table (49)
Results of the Multiple Regression Analysis of Arabic Language Scores

Factor	Correlation Coefficients	Beta Coefficients by Step*				
		1	2	3	4	5
1. Teachers' expectation for students' Motivation.	.35	.35	.318	.308	.315	.283
2. Teacher gender	-.31		-.27	-.247	-.229	-.243
3. Full-time work load	.23			.159	.151	.137
4. Suffering from lack of home cooperation.	-.17				-.143	-.147
5. Attribution of failure to student low level of ability.	-.20					.141
	R	.35	.445	.472	.493	.551
	R2	12.5	19.8	22.3	24.3	26.2

- Teacher gender is coded as: 0= Female, 1= Male.
- Only significant Beta coefficients are reported.
- All ΔR^2 are significant at $\propto = .05$.

It is clear from Table (49) that factors related to teachers of Arabic Language explained 26% of the overall variance in students' scores in Arabic Language. Teachers' expectation of their students' achievement motivation emerged to be a significant factor affecting their students' achievement in Arabic. That is, the students of Arabic Language teachers who expressed high levels of expectation for their students' achievement performed significantly higher than those whose teachers expressed low levels of expectation. The gender of the teacher appeared to contribute significantly to students' achievement in Arabic language. That is, students who were taught by female teachers performed significantly higher than students taught by male teachers. This factor, however, should be looked at with reserve since this effect could be attributed to the gender of students themselves rather than to the gender of the teacher due to the fact that almost all schools are non coeducational.

2. Factors Affecting Achievement in Mathematics.

Table (50) presents the contribution of significant teacher-related variables as emerged in the final multiple regression analysis.

Table (50)
Correlation & Beta Coefficients and Proportion of Explained Variance in Math Scores

Factor	Correlation Coefficients	Beta by Step			
		1	2	3	4
1. Teachers' expectation for students motivation.	.28	.277	.256	.262	.25
2. Full time work load.	.27		.249	.235	.24
3. Suffering from lack of home cooperation.	-.19			-.184	-.18
4. Utilization of instructional aids.	.15				.14
	R	.277	.372	.415	.438
	R2	.070	.138	.172	.192

- All Beta coefficient are statistically significant $p<.05$.
- All ΔR^2 are statistically significant at $p<.05$.

Results indicated that from all teacher-related variables (25 variables), only four of them contributed significantly to the variation in students' achievement in math. All of these four factors together accounted for 19% of the overall variation in students' scores, Apparently, teachers expectation for students' levels of achievement motivation emerged to be the most significant predictor of their students scores in mathematics.

3. Factors Affecting Achievement in Science

Results of the multiple regression analysis (Table 51) indicated that two of the teacher-related factors and the involvement of students in assisting their peers contributed significantly to students' achievement in science. These factors are:
- Teachers' expectation of their students' achievement motivation.
- Full-time work load (whether teachers have any other non-teaching responsibilities).
- Involvement of students in assisting their peers (a four point likert scale variable ranging from 1= never to 4= always).

These factors explained approximately 17% of the overall variance in students' science scores. Teachers expectation for their students achievement motivation appeared to be the most single predictor of students science scores.

Table (51)
rrelation & Beta Coefficients and Proportion of Explained Variance in Science Scores

Factor	Correlation Coefficients	Beta by Step		
		1	2	3
1. Teachers expectation for students motivation.	.32	.32	.304	.28
2. Full time work load.	.21		.185	.193
4. Involvement of students in assisting their peers.	.21			.18
R		.32	.369	.409
R2		.102	.137	.167

- All Beta coefficient are statistically significant at p<.05.
- All ΔR^2 are statistically significant at p<.05.

C. School and Principal-Related Factors Affecting Achievement

The school principal questionnaire included several items/variables measuring conditions of schools, availability of facilities, utilization of school facilities, number of teachers, school size, administration practices, perceived obstacles, school and community relation, staff meetings, qualifications of the principal, and experience in school administration. In order to determine the relative contribution of school and principal-related factors, preliminary analyses were conducted to derive factors. Annex (1) shows the derived factors of all principal questionnaire items. These derived factors and their relationship with students achievement were then carefully investigated. Finally all derived factors (18) were entered into a series of multiple regression analyses to determine the relative contribution of school and principal-related factors in students' achievement.

1. Factors Affecting Achievement Performance on the Arabic Language Test

Table (52) presents the final results of the multiple regression analysis of school average on the Arabic Test on school and principal related factors.

Table (52)
Results of the Multiple Regression Analysis of
Students Means on Arabic Test

Factor	Beta by Step				
	1	2	3	4	5
1. Availability of services in schools (water, electricity..)	.429	.412	.452	.437	.397
2. Involvement of parents in school activities.		.343	.319	.317	.347
3. Lack of financial support.			-.229	-.236	-.202
4. Students complaints about teachers.				.197	.291
5. Number of teachers transferred to other schools.					-.218
R	.429	.549	.59.3	.625	.653
R²	.184	.302	.353	.391	.427

- All Beta coefficient are statistically significant at p<.05.
- All ΔR² are statistically significant at p<.05.

It is clear from Table (52) that none of the factors associated directly with the school principal makes any significant contribution in students' performance on the Arabic language test. All retained factors in the final analysis (Table 52) are characteristics of schools rather than of principals themselves. These factors account for approximately 43% of the variation between schools on the Arabic Language Test. 50% of this explained variance is explained by availability of services in schools such as water, electricity, and air conditioning. Involvement and participation of parents in school life accounts for 12% of overall variance. It is worth mentioning that lack of financial resources and transfer of teachers during the school year affect students' performance negatively.

2. Factors Affecting Achievement on the Mathematics Test

Table (53) shows results of the final model of the multiple regression analysis of students' on the Math Test on school and principal-related factors.

Table (53)
Results of the Multiple Regression Analysis of Students Math Averages

Factor	Beta by Step		
	1	2	3
1. Involvement of parents in school activities.	.285	.261	.250
2. Number of visits to the library by classes.		.253	.271
3. Number of other employees in school.			-.246
R	.285	.381	.453
R^2	.081	.145	.205

- All Beta coefficient are statistically significant at $p<.05$.
- All ΔR^2 are statistically significant at $p<.05$.

As it is clear on Table (53), school factors accounted for 20.5% of the overall variance in student performance on the Math Test. These factors are: participation of parents in school life, students' utilization of the library, and number of other employees in schools (this variable is negatively correlated with schools' averages on the Math Test).

3. Factors Affecting Schools' Performance on the Science Test

Results of the multiple regression analysis (Table 54) indicated that only three factors of school and principal-related factors emerged to have significant impact on schools performance on the Science Test. These factors together accounted for 27.5% of the overall variation between schools on the Science Test.

Table (54)
Results of the Multiple Regression of Schools Performance on Science Test

Factor	Beta by Step		
	1	2	3
1. Availability of services (water..etc).	.355	.339	.378
2. Involvement of parents in school activities.		.32	.298
3. Lack of financial resources.			-.219
R	.355	.478	.524
R^2	.126	.229	.275

- All Beta coefficient are statistically significant at $p<.05$.
- All ΔR^2 are statistically significant at $p<.05$.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Conclusions

This study about fourth grade levels of achievement and factors (students, parents, teachers, and principals) affecting their achievement in the Sultanate of Oman revealed the following results:

- The national average percent correct was 57 on the Arabic Language Test, 54 on the Math Test, 49 on the Science Test, and 48% on the Life Skills Test.

- Only 17% of the sampled students performed higher than 80% correct (mastery level) on the Arabic Test, 8% on the Math Test, 6% on the Science Test, and only 3% on the Life Skills.

- 39%, 39%, 58%, and 53% of students scored below 50 percent correct on the Arabic, Math, and Science Tests and Life Skills, respectively.

- Dhofar, Al-Dhahira, Al-Sharqiya, Al-Dakhiliya students performed consistently better than Al-Wusta and North Batinah students on all tests.

- On the Arabic Language Test, the highest performance was on Reading Subscale and the lowest was on items measuring composition skills. In Math, the highest performance was on Numbers Subscale and the lowest was on Measurement Subscale. In Science, the highest performance was on Universe Subscale and the lowest was on Living Creatures subscale. Finally, in Life Skills, the highest performance was on Daily Behavior Subscale and the lowest was on Civic (National) Education Subscales.

- On both Arabic Language and Life Skills Tests, female students performed significantly higher than male students (the difference was on the average 5%). No GENDER differences, however, were found on Math and Science Tests.

- On all the four tests, private schools' students scored significantly higher (on the average 13% difference) than public schools' students.

- On both Arabic Language and Science Tests, urban schools' students scored higher (4% difference) than rural schools' students.

- Among parental factors, socio-economic status and family academic aspirations for the child appeared to be the most significant contributors to the variation in students' scores on Arabic Language, Math and Science Tests. These two factors correlate positively with achievement in the three subjects.

- Students' external attribution style of academic success (luck, task difficulty) and internal attribution of failure to internal factors (lack of interest) emerged to be the most significast predictors of academic achievement from all other student-related factors in the three subjects (Arabic, Math, and Science). In other words, students who tend to attribute their success to external factors and/or their failure to internal factors achieved significantly lower than those who attribute their success to internal factors. Perceived teacher competency (clarity of instruction, acceptance of students) affect also students achievement in the three subjects (Arabic Language, Math and Science).

- Teachers' high level of expectation for students' academic motivation appeared to be the most significant contributor to the variation in students' scores in the three subjects. Other teacher-related variables such as full-time work load, perceived home cooperation, and utilization of instructional aids also contribute significantly to the variation in students' scores.

- School factors such as availability of facilities and services (electricity, water...) and the degree to which schools involve parents in school activities appeared to affect (positively) students' achievement. Other school variables such as lack of financial resources, number of teachers transfered to other schools annually, and number of other employees in the school appear to affect (negatively) students' achievement.

Policy recommendations

The findings reported here suggest that the conditions that make a significant difference to students' achievement are the students' background, particularly socio-economic status, family aspirations for the child, follow-up of students' school work, students' interest in school, inclination toward reading books, students' attribution to success and failure, students' perceptions of their teachers (clarity of instruction and realistic expectations), teachers' expectations of students' ability and motivation to learn, availability of facilities in schools and parental involvement in school activities. The findings also suggest that schools differ substantially in their academic achievement in Arabic Language, mathematics and science. It makes a difference what school a child attends (private vs. public, urban vs. rural, fully vs. partially equipped). However, the specific aspects of school practice that make some schools more effective than others were difficult to discern. The findings suggest that teachers' qualifications level, participation in in-service training programs, teaching style & methods, and the background and activities of principals make no difference to student achievement.

These findings have several policy implications for the Ministry of Education in Oman:

1. The study provides good baseline data on students' levels of achievement, teaching practices, administrative practices and home-related factors. The data can be used to provide strategic feedback on the reform activities and measures currently being implemented in Oman. The data will enable researchers to estimate changes in school performance over time and to determine whether changes in performances are related to changes in school (system) policy and practice.

2. The findings clearly indicate the importance of renewed efforts, within the framework of the national educational reform, to improve the quality of primary school teaching/learning processes, given the rather low student achievement levels in all subjects covered in the project.

3. The Ministry of Education should conduct a careful evaluation of the impact of its in-service training and certification programs for teachers and principals. The most critical question is whether this program is leading to changes in teaching methods. If teachers and principals come out of those programs with a certificate but teach and manage schools much the same as they did before they entered, the present system of training and certification might be abolished because it is making no difference for education.

4. In-service teacher-training programs should include other components related to teachers' knowledge and beliefs about student

success and failure. Training programs should not be directed only to fine-turning of teaching practice but should also include strategies to challenge teachers' beliefs, perceptions about their students' success or failure. Results showed that teachers tend to attribute students success and failure to external factors (student ability, parental follow-up) rather than to their own good or bad teaching. This would unconsciously force teachers not to extend any effort to bring about desirable changes in students' learning.

5. Primary school principals in Oman seem to work more as administrators than as instructional leaders. This is a situation that is common in many countries. Experience in other ..... (Those and for example) shows that principals can be taught to mobilise teachers into better performance. If that is to happen, however, all those involved in operating schools must have the same perspective. If principals alone are trained in leadership, their initiatives can easily be undercut by supervisors or teachers who do not believe they have any right to be leaders rather than administrators.

6. Results indicate a clear need to address regional, rural/urban, socio-economic, and public/private disparities in educational quality and attainment.

7. Given the apparent importance of family background and attitudes ·and children's out of school activities (reading activities in particular), it is crucial to draw parents and community more fully into the educational process as a whole (through parent-teacher associations..etc).

8. Results present an opportunity to seize the link uncovered between parents' (especially mothers') educational level and students' achievement levels, for advocacy purposes, stressing the importance of girls' education to higher levels in the interests of their roles as future mothers.

9. The importance of institutionalizing national processes of educational monitoring and evaluation, and in the context of Oman, linking these to the national educational reform program. The assessment program could be extended to cover other grades and subjects matters.

10. There is a need for more qualitative studies and assessment of contextual factors on student achievements. New surveys of schools should use interviews and observations to collect data on certain aspects of school life (classroom teaching practices for example).

ANNEX 1
FACTORS ENTERED IN THE REGRESSION ANALYSIS

1.1 Factors Derived from the Parent Questionnaire:

1. Family size.... represents number of siblings (Q7A, Q7B)

2. Number of years the child enrolls in schools (Q5).

3. Socio-economic status (SES)... a factor score derived through factor analysis of Q13, Q14A, and Q15. This factor represents family income, fathers' education and mothers' education. 56% of the variance was accounted for by this factor.

4. Availability of modern facilities at home (Q19A to Q19J). This factor was derived through simple counting procedure.

5. Family academic aspiration for thier child (Q29).

6. Availability of private tutor (Q31).

7. Parental follow-up style of child's school work..
   Two factors were emerged through factor analysis. There factors are:
   a. Daily follow-up (Q36-4, Q36-3, Q36-5). This factor accounted for 32.4% of the variance.
   b. Intermittent follow-up (Q36-1, Q36-2).
   This factor accounted for 21.2% of the variance.

8. Parental attribution style of success... two factors were emerged as a result of factor analysis.
   These factors are:
   a. attribution of success to internal causes (Q41-1, Q41-2, Q41-3, Q41-4). 29% of the variance were accounted for by this factor.
   b. attribution of success to private tutoring (F41-5). 20% of the variance were explained by this factor.

9. Parental reaction to student's academic failure... as a result of factor analysis two factors emerged:
   a. Increased concern and attention (Q43-5, Q43-3, Q43-4).
   b. Punishment (Q43-1, Q43-2).

10. Number of hours the child spends daily on watching TV. (Q35B).

11. Number of hours the child spends daily on playing outside house (G35C).

1.2 Factors Derived from the Student Questionnaire:

1. Student geader (Females=0, Males=1).

2. Inclination towards school. This factor was derived through simple counting procedure to questions Q1A-1 to Q1A-5.

3. Inclination towards reading books or stories (Q5).

4. Physical environment of the classroom. This factor was derived through factor analysis of questions Q2A to Q2H. 26.5% of the variance on these items were accounted for by this factor.

5. Attribution of success and failure: Three factors were emerged as a result of the factor analysis of questions Q26A, Q26B, Q26C, Q27A, Q27B, Q27C, Q27D, Q27E, Q27F, and Q27G. These factors are:
   a. Attribution of failure to lack of interest: 20.2% of the variance were accounted for by this factor. (Q27B, Q27F, Q27D, Q27G).
   b. Attribution of failure to test difficulty (Q27E, Q27A, Q27C). 12.3% of the variance were accounted for by this factor.
   c. Attribution of success to external causes (Q26A, Q26C). This factor accounted for 11% of the variance.

6. Perceived effectiveness of the Arabic Language teacher. As a result of the factor analysis of a scale composed of questions Q9A to Q9Q three factors emerged:

   a. Clarity of presentation of material (Q9H, Q9D, Q9B, Q9A, Q9G, Q9I, Q9L, Q9Q). This factor accounted for 15.7% of the variance.

   b. Teacher's unrealistic expectation for students' ability to learn (Q9J, Q9N, Q9F). This factor accounted for 12.1% of the variance.

   c. Teacher usage of punishment (Q9E, Q9K). 6.3% of the variance were accounted for by this factor.

7. Perceived effectiveness of the Math Teacher. Four factors emerged through Factor analysis:

   a. Clarity of presentation of material (Q13I, Q13A, Q13E, Q13G, Q13L). This factor accounted for 16.7% of the variance.

   b. Teacher's unrealistic expectations (Q13P, Q13N, Q13F). 11.4% of the variance were accounted for by this factor.

   c. Acceptance of students (Q13D, Q13B, Q13Q, Q13J). This factor accounted for 6.3% of the variance.

   d. Teachers usage of punishment (Q13O, Q13H). 6.1% of the variance were accounted for by this factor.

8. Perceived effectiveness of the Science teacher-Five factors were emerged as a result of factor analysis:

   a. Clarity of material presentation (Q17I, Q17F, Q17E, Q17G, Q17A). This factor accounted for 17.4% of the variance.

   b. Acceptance of students (Q17D, Q17J, Q17B, Q17L). 12.2% of the variance were accounted for by this factor.

   c. Unrealistic expectations (Q17P, Q17N). This factor accounted for 6.3% of the variance.

   d. Monitoring of students' Learning (Q17K, Q17C, Q17M, Q17Q). This factor accounted for 5.5% of the variance.

   e. Punishment (Q17O, Q17H). 5.4% of the variance were accounted for by this factor.

9. Students' perception of task/homework difficulty (Q11 for Arabic, Q15 for Math, and Q19 for Science).

10. Diversity of assessment tools (Q12 for Arabic, Q16 for Math and Q20 for Science).

11. Frequency of school principals' visits to class (Q3).

12. Opportunity to learn in case of teacher absenteeism (Q4).

1.3 Factors Derived from the Teacher Questionnaire:

1. Teacher's qualification (Q1).

2. Full-time work load (Q3). This factor represents wheather the teacher performs other non-teaching duties. The more the teacher work load (number of teaching periods) is, the probability is less that the teacher has non-teaching responsibilities.

3. Number or years of teaching experience (Q5).

4. Other activities after school day (Q18B1 to Q18B5).

5. Attitude towards teaching profession (Q19).

6. Job satisfaction (Q20).

7. Expectation for students' motivation to learns (Q21).

8. Teacher's perception of students' behavioral problems (Q22).

9. Attribution of students' low levels of achievement: Two factors were emerged through factory analysis of items (Q23-1 to Q23-6):
   a. Lack of interest towards subject (Q23-6, Q23-5, Q23-3). This factor explained 33.4% of the variance.
   b. Lack of students ability to learn (Q23-4, Q23-1, Q23-2). 18.3% of the variance were accounted for by this factor.

10. Perceived hindrances to effective teaching. Three factors emerged from factor analysis:
    a. Lack of adequate educational facilities at school (Q26-A, Q26-C. Q26-B).
    b. Lack of healthy working environment (Q26-D, Q26-E, Q26-14).
    c. Lack of home cooperation (Q26-F, Q26-G).

11. Attitude towards daily lesson preparation. This factor is a factor score of Q27-A, Q27-B, Q27-C.

12. Teaching strategies: Four factors were emerged through factor analysis of eleven items measuring employed teaching practices (Q34-1 to Q34-11):
    a. Focus on learning objectivies (Q34-1, Q23-11, Q34-6, Q34-4. Q34-2). This factor accounted for 24% of the variance.
    b. Utilization of instructional aids (Q34-10, Q34-3, Q34-8). This factor accounted for 12.5% of the variance.
    c. Focus on lesson application and integration (Q34-9, Q34-7). This factor accounted for 9.8% of the variance.
    d. Utilization of time allocated for instruction (Q34-5). This factor accounted for 8.2% of the variance.

13. Class size: Number of students in this class (fourth grade: Q43).

14. Number of visits of the supervisor this year (Q47-A).

15. Perceived teaching competence: A general factor derived through factory analysis of 9 items (Q48A-1 to Q48A-9).

16. Frequency of homework assignments (Q31A).

17. Involvement of some students in assisting their peers (Q37).

1.4 Factors Derived from the Principal Questionnaire:

1. Number of teachers in school (Q9).
2. Availability of other administrative staff (Q10-1 to Q10-5).
3. Number of other employees in school (Q11 to Q14).
4. Availability of services (Electricity, tap water, air conditioning) Q23-Q25.
5. Availability of educational facilities (Q28-1 to Q28-17).
6. Availability of instructional equipments (Q34-1 to Q34-6).
7. Reported students' complaints about teachers (Q36, Q37).
8. Number of principals of the school over 3 years (Q46).
9. Number of teachers currently enrolled in staff development programs (Q50-A-Q50C).
10. Type of issues usually discussed in staff meetings (Q57-A to Q57-E).
11. Number of services the school has provided to the community this year (Q60B-1 to Q60B-9).
12. Proportion of Omani teachers in the school (Q9A/total number of teachers x100).
13. Class range (high class-Low class+1) (Q1).
14. Problems (hindrances) the school is suffering from: Three types (factors) of problems emerged as a result of a factor analysis of 18 items (Q41-1 to Q41-18). These factors are:
    a. Administrative problems (Q41-2, Q41-12, Q41-5, Q41-4, Q41-8, Q41-1, Q41-16, Q41-10, Q41-11, Q41-9)
    b. Lack of financial support (Q41-7, Q41-13, Q41-15, Q41-17).
    c. Lack of parental involvement in school activities (Q41-3, Q41-18). All these factors accounted for 73.5% of the variance (60%, 7.3% 6.4% for factors, 1, 2, and 3, respectively).

Main Results of the 1994 Labor,

Unemployment & income Survey

Organization and Methodology of the Survey

Objectives of the Survey

The 1994 Employment, Unemployment, and Income Survey (EUIS) is a national sample survey designed to collect data on employment, unemployment, educational enrollment. rates and other related matters of special concern to the to the National, Research and Educational Development Center (NCERD) at the national and regional levels. The areas covered include demographic and socioeconomic characteristics, school enrollment, drop out from school, education level, employment and unemployment, house condition and household's average monthly income and expenditure.

The study aims to explore the linkages between various types of vocational training and employment. It aims also to explore and analyze, in depth, the problem of school drop out with regard to its size, reasons and remedy. The objectives, namely, are:

I. Identifying effectiveness of training programs in the following aspects:

    a. Adequacy of training programs for available jobs and the assurance that these programs meet the needs imposed by changing technologies.

    b. Time needed by Vocational training graduates to find jobs.

    c. percentage of those graduates who are self-employed.

    d. Percentage of vocational training graduates who find jobs in line with their specialization.

II. Identifying graduates wage level.

III. Identify the contribution of the technical and vocational training institutions in response to the labor market needs in the field of training.

IV. Identify the magnitude of school enrollment and school drop out.

V. Identify the magnitude of employment and unemployment, with some emphasis on the characteristics of the unemployed.

Organization of the Survey

The EUIS survey was executed in four stages; the first was the preparatory stage, which involved the preparation of the survey documents and the execution of the pre-test; the documents included the survey questionnaire; instruction, classification and definition manuals; and the dummy tables of the survey. At the same time, the listing of housing units, and the design and implementation of sampling procedures were performed. All these activities were completed in May 1994. Also the recruitment and training of personnel needed to conduct the survey took place at this stage. The second stage was the interviewing and collection of data. Data collection took place from May through June 1994. The third stage involved data processing and evaluation. Data entry started soon after the beginning of the field work, and continued until July 1994. Finally, the fourth stage, involved analyzing the results and producing the final report..

Sample Frame and Design

The sample for the EUIS survey was selected to be representative of the major geographical region as well as the country as a whole. Administratively, Jordan is divided into 8 governorates.[1] The largest governorates are Amman, Irbid and Zarqa, located in the central and northern of high lands. These three governorates constitute more than 80 per cent of the population of Jordan. The remaining five governorates share the remaining 20 per cent of the population.

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[1] This survey was designed before the creation of the new four governorates.

The sample of this survey is based on a recently updated frame of households covering all localities in Jordan. The updating procedures covered a mapping operation of all the localities, which produced enumeration areas (blocks) each of which consist of about 100 households. In this sampling design of the survey, each block was considered as the primary sampling unit (PSU). The mapping operations were accompanied by a complete listing of all households in each block in the country. The end goal was to assign a unique statistical address for every household in the country.

A multi-stage, replicated, cluster and stratified sampling procedures was implemented for this survey. A total of 600 primary sampling units (PSUs) were selected covering all governorates yielding a total of 12000 households (20 households per PSU). The 600 PSUs were allocated among the governorates, which are the strata for the survey, proportionally to the population size of each governorate.

The allocated PSUs for each governorate were selected in the first stage with a probability proportional to their sizes (i.e. the total number of households in the PSU). Within each governorate (stratum) the allocated PSUs were selected independently with probability proportion to the sizes.

In the second stage of sample selection, households within each of the sample PSUs were chosen. The probability of selecting a household in a PSU is inversely proportional to the total number of households in the PSU. This probability is maintained across governorates. In other words, the sampling is self-weighted design which means that all households in the sample frame have the same probability of being selected for the survey.

The following table shows the distribution of PSUs allocated for each governorate and the total number of households and the percentage distribution if households with completed interviews.

Governorate	Number of PSUs	Number of households completed	percentage distribution
Amman	240	4763	42.0
Zarqa	96	1794	15.8
Irbid	144	2677	23.6
Mafraq	24	381	3.3
Balqa	36	691	6.1
Karak	24	444	4.0
Tafiela	12	172	1.5
Ma'an	24	421	3.7
Total	600	11343	100.0

The Questionnaire

The questionnaire used in the EUIS survey was developed during the first stage with the participation of the Department of Statistics (DOS) staff, the Director of NCERD, the Director of Human Resources Planning Department at the Ministry of Planning and consultant from Harvard University. The Questionnaire consisted of Four parts. The first part focused on listing all member of sample households, including usual residence and visitors. For each member of the household basic demographic and social characteristics were recorded. These characteristics were related to relation to head of the head of the household, sex, age, place of residence, nationality. and the education level of the mother and father of each member of the household.

The second part covered questions related to school enrollment, reason for not enrolling or leaving school, educational authority and number of schooling years for all members of households who are 5 years old and above. This part also covered data related to educational attainment and specialization for all household members who are 15 years old or above.

The third part focused on the relation of all household members, who are 15 years old or above, to manpower. It involved questions related to employment, unemployment, occupation, economic activity, training and reasons for being unemployed. In addition it covered questions related to the attitudes of those who are unemployed towards employment opportunities, which are below their expectations or have difficult conditions.

The fourth part contained questions related to dwellings, regarding type of dwelling (i.e. apartment, villa) and type of ownership. In addition this part covered data related to the monthly average income and expenditure.

Instructions Manual

This manual involved group of definitions and detailed instructions for field workers as well as office officers. It also involved detailed explanations and definitions for all questions, concepts, and standards included in the questionnaire. The manual included also rules for editing that should be followed by all field and office personnel at the time of editing the questionnaire. Some emphasis were given for the internal consistency check to assure the accuracy of data.

Coding and Editing Manuals

All the questions in the questionnaire, except those related to specialization, economic activity and occupation, were pre-coded. Thus, this manual involved the way to handle the precoded questions and how to code the questions with specific answers (general coding). The manual includes also instructions regarding the coding of school specialization, occupation and economic activity utilizing the united nations standard classifications.

Recruitment and Training of Field Staff

About 50 interviewers and 15 field editors were deployed for the field work. Most of these were recruited in each of the eight governorates. The fifteen supervisors who worked in the survey were all regular employees of the DOS and all had considerable field experience.

Intensive training has been conducted for the interviewers. The training centered around the questionnaire which has discussed in detailed using interviewers' instruction manual. Training also included mock interviews in which they resided. Finally, a field practice session was scheduled in which trainees were explained the procedures for identifying sampled blocks and trainees conducted interviewers of residents.

Pretest

The questionnaire was pretested in April 1994 in a number of urban and rural clusters. All senior staff members of the survey organization participated in this activity. The field staff for the pretest was made up of university graduates hired through the government recruitment office. The aim of the pretest was to examine the questionnaire; the extent of adequacy of the questions, classifications and concepts; productivity of the interviewers; and the response of the respondents.

Pretest training, which lasted one week, involved class discussion and field practice. The pretest teams were also trained to carry out supervisory tasks, since they were expected to act as supervisors or field editors during the main fieldwork.

Fieldwork Activities

Prior to the main survey fieldwork, mapping was carried out and the enumeration areas (blocks) were selected. The fieldwork for the survey began on 10 may, 1994 and was completed after a period of slightly less than two months. The fieldwork was carried out by eight teams, each consisting of four interviewers, one field editor and one supervisor. The general pattern of the work was as follows: the supervisor's function was to locate the sample block and its boundaries with the help of maps and sketches that were provided to him by DOS. He divided the blocks into small segments containing adjacent housing units and assigned them to interviewers. The interviewer visited each housing unit in the assigned areas to complete the interviews.

The supervisor also contacted each of the interviewers and assisted in solving their problems, if any, and checked their work. He collected completed questionnaires to pass them on to field editors checked them thoroughly for missing information and inconsistencies. Errors found were corrected in the field and, when necessary, households with errors were revisited.

To reduce the non-responses, in those instances when no member of the household was present on the first visit, the supervisor were instructed to return to the household on different dates (with a maximum of three visits) to try to complete the interviews. This procedures resulted in a completed interview for almost every household eligible for interview. In general, no unusual difficulties were encountered during the fieldwork.

Data Processing

Data processing started soon after the fieldwork began. The completed questionnaires in the field were periodically sent to the central office in Amman, where they were logged in and stored in folders. Manual editing of the questionnaire began in early July 1994. Each questionnaire was thoroughly edited using the same set of checks used by the field editors.

Although most items of the questionnaire were precoded, some, such as educational specialization, occupation and type of economic activity, had to be coded in the office using the standard international code books. The coding began in mid of July and done concurrently with the manual editing process.

Data entry started one week after the beginning of fieldwork, using eight microcomputers. The process of data entry, editing and cleaning was done with ORACLE. Tabulation were produced by DOS using SPSS package.

MATCH BETWEEN SPECIALIZATION AND ACTIVITY

This section is trying to examine and explore the relation between worker's education specialization and the work they are doing (activity) now. As we all know, there is no specialization below the secondary education level. However, this section will present the distribution of workers with different education's levels by the various activities of the economy.

Table (1) shows the percentage distribution of workers according to their education specialization and their activities. It indicates that 30.8% of those who are illiterate and employed are working in agricultural activities, while 16.9% of this group are working in the trade activities (whole and retail sale), and 9% are working in manufacturing. It is noted that illiterate workers are unevenly distributed over the 16 groups of activities.

Those workers who can read and write are also distributed over the all activities with fewer disparities compared with those who are illiterate. Table (1) indicates that 23% of those workers who can read and write (with no formal education) are working in sale activities. Agricultural activities absorb 15.1% of this workers' category; while, transportation and storage activities absorb 12.7% of them.

With regard to those workers who finished primary education, 22.2% of them (the highest share) are working in public administration activity, while 16.1% of them are working in manufacturing, and 20% are working in sales activities. Transport, storage activity absorbs 11.5% of this category of workers. The highest chunk of those workers who completed preparatory education is working in the public administration activity (29.4%); with almost equal percentages (16.1 and 16.9%) are working in the trade and manufacturing activities, respectively.

Two general notes on these categories of workers follow:

1. Few percentages of each category are working in the activities that require individuals with high qualifications such as education, health and social workers, finance, etc. And even those categories are working in minor jobs such as guards, messengers, cleaner, etc.

2. It has been noted that as we go up in the educational level, the percentage of workers from each category who are working in the public administration is increasing.

WORKERS WITH SECONDARY EDUCATIONAL LEVEL

Secondary education level has different streams consisting of Arts, Science, Commercial, Nursing, Industrial, Agricultural, Postal, Hotels and others. Table (1) shows the percentage distribution of workers from each category by the type of activity that they are working in.

Workers who are art secondary education's graduates, are concentrating on the public administration activities. Almost 32% of this category are working in the public administration activity; while 15.4% of them are working in the trade activities. The third largest chunk of this category is working in the manufacturing activities (10.9%).

More than one-fifth of those workers, who science secondary education's graduates, are working in trade activities. Public administration activities absorb 19.8% of those graduates, while manufacturing activities absorb 13.7%, mining and quarrying activities absorb the lesser percentage of this category of workers (0.7%).

With regard to workers who completed commercial secondary education, 23.8% of them are working in the public administration activity; while 18.5% of them are working in manufacturing. The trade activities (whole and retail) employed 16.9% of these category graduates.

Nursing is other branch of secondary education. Although the number of workers in the sample who are graduates of nursing is small (39), almost four fifths of those are working in health and social services activities. About 8% of them are working in manufacturing activities.

Industrial secondary education's graduates are the third with respect to their volume comparing with other secondary education graduates. More than one-fourth of them are working in the public administration activities, while 18% of them are working in the manufacturing activities.

One-third of those workers who completed agricultural secondary education are working in public administration activities, compared with only 14.3% are working in agricultural activities.

The size of workers who are graduates of other secondary education branches is small, that we are unable to build upon them adequate results.

GENERAL COMMENTS:

1. There is a considerable mismatch between the different secondary education graduates and the type of activities they are performing. This can be noticed clearly when observing that a high percentage of vocational secondary education graduates are working in the public administration activities compared with the low percentage of academic secondary education graduates. Eighteen percent of the industrial secondary education' graduates are working in manufacturing; at the same time, only 14.3% of those who completed agricultural secondary education are working in agricultural activities.

2. A high proportion of vocational secondary education' graduates, except nursing, is working in the public administration activities (centered around 25%).

3. There is a need to put a set of policies regarding the type and context of secondary education in all streams.

TABLE (1): PERCENTAGE DISTRIBUTION OF WORKERS WHO ARE SECONDARY EDUCATION OR LESS BY LEVEL AND TYPE OF EDUCATION AND ACTIVITY FOR 1994

Item	agri-culture	mining & guarding	manu-facturing	gas, water	construc-tion	trade whole, retail sale	hotels & restau-rants	trans-port, storage	finance	real estate	public administ-ration	n	hotels & social services	other community services	private s	inter-national s	Total No.
illiterate	30.8	1.8	9.0	1.9	8.2	16.9	1.2	9.0	0.2	0.2	6.2	4.6	2.6	6.6	0.5	0.3	1010
read and write	15.1	1.3	12.0	2.2	10.8	23.0	1.6	12.7	0.4	0.6	9.9	1.7	1.2	6.2	0.2	0.1	972
primary	6.1	0.9	16.1	1.5	10.1	20.0	1.6	11.5	0.6	0.7	22.2	2.2	2.0	4.1		0.3	2827
elementary	3.7	0.5	16.1	1.5	9.0	16.9	2.5	10.2	0.5	1.4	29.4	1.9	1.9	3.7		0.7	3813
Gen	1.3	1.3	11.5	2.6	3.8	39.7	2.6	3.8	2.6	2.6	17.9	2.6	5.1	2.6	0.1	0.7	78
secondary																	
art	2.5	0.4	10.9	1.8	4.2	15.4	2.3	11.0	2.5	2.0	31.6	3.9	4.9	5.9		0.6	1068
science	1.1	0.7	13.7	2.0	7.7	22.1	3.6	11.0	3.8	3.4	19.8	4.1	3.8	2.9		0.2	444
commercial	2.3	-	18.5	1.5	3.8	16.9	-	13.1	5.4	3.8	23.8	4.6	2.3	3.8		-	130
nursing	-	-	7.7	-	-	2.6	-	2.6	2.6	-	5.1	-	79.5	-		-	39
industry	2.4	1.4	17.0	3.7	13.5	16.9	1.4	8.4	-	1.4	26.4	2.0	1.0	3.0		0.7	296
agriculture	14.3	-	4.3	4.8	4.8	7.1	-	11.9	1.4	4.8	33.3	4.8	2.4	4.8	2.4	-	42
post	-	-	-	-	-	-	-	40.0	-	-	40.0	-	-	20.0			5
hotels	-	-	12.5	-	-	25.0	62.5	-	-	-	-	-	-	-			8
other	-	16.7	16.7	-	16.7	-	-	-	-	-	-	33.3	16.7	-			6

WORKERS WITH COMMUNITY COLLEGES' DIPLOMA

Several education programs are offered by community colleges in Jordan with different specialization; these specialization's were regrouped in 18 groups according to industrial standard classification of specifications. Table (2) shows these groups of specialization. It also presents the percentage distribution of these workers in the sample survey who are community college graduates by their specialization and the activities they are in for the year 1994.

As the Table shows, 83.5% of those workers who are community colleges' graduates from the teachers training program, are working in education. This represents a big chunk of this program's graduates, that reflects big match between the graduates of this program of specialization and the activities they perform.

Of those workers who are community colleges' graduates and specialized in fine art, 29.2% are working in other community and social services, and 25% are working in the education activity.

Workers who are community colleges' graduates and specialized in humanities, are concentrated in education; almost three-fourth of them are working in education activities.

More than half of those who are religion program's graduates are working in education activity; while 23.5% are working in other community and social services and 17.6% are working in public administration.

Those workers who are specialized in social and behavior programs are spread all over the activities. However, the big chunk (54.8%) is working in education activity.

Workers who are community college graduates and specialized in commercial and business programs are covering all the activities. Seventeen percent of them are working in public administration activities, while 20% of them are working in whole sale and retail trade activities.

Of those workers who are specialized in natural science, 79.7% are working in education, while the rest are distributed over few activities.

Workers who are graduates of mathematics and computer science programs are involved in many activities. Almost 48% of them are working in education, compared with 12.3% in both manufacturing and in whole sale and retail trade activities.

With regard to workers who are community colleges' graduates and specialized in medical and health, 59.9% are working in health and social work activities, while 18.7% of them are working in whole sale and retail trade activities.

Of those who are community colleges' graduates and specialized in trade, crafts, 24.8%, 23.9% and 18.1% of them are working in manufacturing, public administration, and whole sale and retail trade activities respectively.

With regard to the engineering programs' graduates, 17.4% of them are working in public administration compared with 14.4%, 12.9%, 12.9% and 10.9% working in whole sale and retail trade, manufacturing, construction and real estate respectively.

The numbers of workers who are specialized in other areas are small in the sample, that we are not able to build upon these figures a reasonable results.

GENERAL COMMENTS.

1. Mostof the workers who are community colleges' graduates with different specialization are working in education activities.

2. There is a clear mismatch between many specialization and activities, since we notice that there are many graduates of each specialty who spread all over the activities.

WORKERS WITH BA/B.SC. DEGREE

Table (3) shows the percentage distribution of workers who are university graduates with bachelor degree by their specialization and activity.

About eighty-five percent of the graduates of the teacher training and education science program's graduates are working in education activities. While 6.8% of them are working in the public administration activities, followed by 5.1% working in other community and social services activities.

Almost two thirds of the graduates of each of the fine arts, humanities and religion programs are working in education activity. Public administration is the second largest activity that absorbs the graduates of the humanity's program (9.0%) and religion program (15.2%). As it can be noticed, the graduates of the humanity's program are spread all over the economic activities, although they are unevenly distributed.

One third of the social and behavioral program graduates is working in education activity. Also about 22% of these program graduates are working in public administration activity.

Commercial program's graduates have the third largest group with regard to number of graduates, after the engineering and humanity's programs. More than one fifth of these program graduates is working in public administration activity. The whole sale and retail activity absorb about 18% of these program graduates. In general, the graduates of this program, as in the humanity's program graduates, are unevenly spread over all the economic activities.

Two-fifths of the law and jurisdiction program graduates are working in the public administration activity. More than third of them is working in real estate activity.

More than 64% of the natural science program graduates and half of the mathematics and computer program graduates are working in the education activities. While each of the whole sale and retail trade, and the public administration activities absorb 14.9% of this program graduates.

Engineering program has the largest number of graduates who are working. The graduates of this program are spread over all economic activities. The highest percentage of them are working in the real estate activities (17.5%); while the second largest percentage of them are working in the public administration activity (16.1%).

General comments:

1. Most of the workers who are university's graduates, with different specialization, are pivoted around two activities which are education and public administration.

2. The other two activities, that come after education and public administration, which attract a significant portion of those graduates are the whole sale and retail trade, and manufacturing activities.

3. There is a clear mismatching between the specialization of the workers and the activities they are performing. This can be realized from the spread over many activities of each specialization, with lesser degree than it was witnessed among the community college graduates.

TABLE (3): THE PERCENTAGE DISTRIBUTION OF WORKERS WHO ARE BA/ B.SC. GRADUATES
BY THEIR SPECIALIZATION AND ACTIVITY FOR THE YEAR 1994

Item	agri-culture	mining & guarding	manu-facturing	gas & water	construc-tion	trade, whole & retail	hotels & restau-rants	trans-portation	finance	real estate	public administ-ration	educa-tion	health—	other social services	ional s	Total No.
Teacher Training	-	-	-	-	-	1.7	-	-	-	-	6.8	84.7	-	5.1	1.7	59
Fine Arts Programs	-	11.1	-	-	-	-	-	-	-	11.1	-	66.7	-	11.1	-	9
Humanities	0.7	0.7	2.1	0.3	1.0	6.9	0.3	5.2	2.1	2.1	9.0	65.7	0.3	3.1	0.3	289
Religion	-	-	-	-	-	2.2	2.2	-	-	2.2	15.2	67.4	-	10.9	-	46
Social & Behavioral	-	-	4.0	1.3	0.7	11.4	-	7.4	8.7	2.0	21.5	33.6	4.0	4.7	0.7	149
Commercial	1.6	0.8	12.0	0.8	3.1	17.8	1.2	7.4	14.0	7.0	20.9	11.2	1.2	0.4	0.8	258
Law & Jurisdiction	2.5	-	1.7	-	-	5.1	-	8.5	1.7	36.4	39.0	3.4	-	0.8	0.8	118
Natural Sciences	-	1.1	4.6	-	1.1	9.2	-	1.1	-	3.4	9.2	64.4	4.6	-	1.1	87
Math	-	1.4	4.1	-	-	14.9	-	2.7	2.7	6.8	14.9	50.0	-	2.7	-	74
Medical	-	0.8	5.6	-	-	9.7	-	1.6	0.8	0.8	4.8	4.8	71.0	-	-	124
Engineering	6.2	1.0	11.6	2.7	13.4	13.4	0.7	6.8	1.0	17.5	16.1	5.5	1.4	2.4	0.3	292
Agricultural	30.4	-	13.0	-	4.3	13.0	-	-	-	-	13.0	8.7	13.0	4.3	-	23
Transport	-	-	20.0	-	-	-	-	80.0	-	-	-	-	-	-	-	5
Mass communication	-	-	29.2	-	8.3	8.3	-	4.2	12.5	-	33.3	-	-	4.2	-	24
other programs	-	-	-	-	-	4.2	4.2	8.3	4.2	-	66.7	8.3	-	4.2	-	24

UNEMPLOYMENT

Unemployment reflects the imbalances between labor market needs and supply of labor with regard to quality and quantity of graduates on school levers.

Unemployment Rates by Level of Education

Table 4 indicates that unemployment rate among Jordanian Labor Force for mid 1994 is 15.8%. This rate differs between males and females. The unemployment rate among male labor force is 13.6% compared to 29.3% among females.

Table (4)
Unemployment Rate by Education Level & Sex (%)

Education level	Female	male	Total
Illiterate	5.3	6.1	6.0
Read & write	0	12.3	12.0
Primary	15.9	14.2	14.2
Elementary	24.0	14.6	15.1
Secondary	27.2	14.6	16.2
Diploma	38.4	17.1	27.3
B. A	22.5	11.9	14.6
High Diploma	0	3.8	3.3
M. A	4.0	7.1	6.6
Ph. D	0	4.0	3.9
Total	29.4	13.6	15.8

The data show that there are large differences in the unemployment rate among the labor force according to their education & sex. The highest unemployment rate is among community colleges' graduates (27.3%). The second highest unemployment rate is among secondary education graduates (16.2%). The lowest unemployment rate is among the labor force with high diploma degree (3.3). The unemployment rates among labor force with primary, preparatory education and university first degree are close to each other; ranging from 14.2% to 15.1%.

Unemployment rates differ between male and female labor force and by education level. The highest unemployment rates among male and female labor force are among those who are community colleges graduates (17.1 and 38.4% respectively). The second highest unemployment rate among male labor force is among those with preparatory and secondary education (14.6%); while among female labor force it is among those who completed secondary education (27.2%). The lowest unemployment rate among male labor force is among those with high diploma; while there are zero unemployment rates among female labor force who can read and write and those with high diploma or Ph.D degree.

Unemployment Rates among Secondary Education Graduates

Table (5) shows the unemployment rate among labor force who have secondary education qualification by specialization and sex. The highest unemployment rate is among the graduates of other secondary education which is not specified in the table (45.5%). The second highest unemployment rate is among those with the hotelier secondary education (38.5%); followed by that among graduates of the nursery secondary education (22%).

Table (5)
Unemployment Rate among Secondary Education
Graduates by type of Specialization & Sex 1994

Secondary	Female	Male	Total
Metric	25.0	12.8	13.3
Art	30.8	13.1	15.6
Science	22.7	16.8	17.6
Commercial	25.0	14.9	17.2
Nursery	18.8	27.8	22.0
Industrial	0*	15.1	14.9
Agricultural	0*	11.1	10.6
Postal	0*	33.3	16.7
Hotelier	0*	38.5	38.5
Other	57.1	25.0	45.5

* Few cases.(less than five)

The lowest unemployment rate is among those who have agricultural secondary education qualification (10.6%). The second lowest unemployment rate is among those who have metric qualification (13.3%). As it can be noticed from the table, unemployment rates among those who have art and industrial secondary education are within the rate of the national level (15.8%).

Unemployment rates are higher among females for all secondary education specialization, except among graduates of nursery secondary education, where the unemployment rate among males (27.8%) is higher than that among females (18.8%).

Unemployment rates among community colleges' graduates

Labor force with community colleges qualification have the highest unemployment rate among others (27.3%). However, the unemployment rate among community colleges' graduates differs by specialization and sex. The highest unemployment rate is founded among graduates of the mass communication and documentation program (54.3%). The second highest unemployment rate is among graduates of religion program; followed by the unemployment rate among graduates of the natural science program (table 6).

The lowest unemployment rate is founded among graduates of agricultural, forestry and fishery program (5%). The second lowest unemployment rate is among those who graduated from the transport and communication program. In general, the unemployment rates are above the national level (15.8%) among all community colleges programs' graduates except those who graduated from the engineering (13.7%), agricultural (5%), and transport and communication (7.1%) programs.

The unemployment rates among community colleges' graduates differ by sex. In general the unemployment rates among female graduates of all community colleges programs are higher than those rates among males graduates of the same programs. The highest unemployment rate among female graduates is found among those who graduated from the

religion program (69.2%). While the highest unemployment rates among males graduates is founded among those who graduated from the mass communication and documentation program. here are few programs that show no unemployment among their males graduates. These are: engineering, agricultural, home economics, and transport and communication programs.

Table (6)
Unemployment rate among community colleges' graduates by specialization and sex for 1994

Program	Female	Male	Total
Teacher training & education	34.8	18.3	30.7
Fine arts	40.0	25.0	31.4
Humanities	38.1	12.8	29.6
Religion	69.2	15.4	47.7
Social & behavioral science	48.1	23.9	36.7
Commercial & business administration	36.3	15.2	21.3
Natural science	46.3	16.7	33.3
Mathematics & computer science	39.6	26.5	32.5
Medical & health related	26.2	21.1	22.9
Trade, crafts & industrial	(50.0)*	19.5	20.5
Engineering	(50.0)*	0	13.7
Agricultural, forestry & fishery	(50.0)*	0	5.0
Home economics	16.7	0	15.3
Transport & communication	(50.0)*	0	7.1
Mass communication & documentation	65.0	40.0	54.3
Other	16.7	16.7	16.7
Total (community colleges)	38.4	17.1	27.3

* Few cases (less than five).

Unemployment rates among university graduates of B.A/ B.Sc. level

Although the unemployment rate among university graduates of B.A. level is relatively high (14.6%); but yet it is far away below the level of unemployment rate among community colleges' graduates (27.3%). Moreover it is still below the national level (15.8%). The unemployment rates differ among universities' graduates according to their specialization

and their gender. The highest unemployment rate among the total universities graduates of B.A. level is founded among those who graduated from the fine arts program (35.7%). While the lowest rate is founded, other than the graduates of other program, among graduates of teacher training and education science programs (10%). There are many programs whose graduates have unemployment rates below the national level. These are: humanities (15%), law and jurisprudence (12.6%), mathematics and computer (13%), engineering (12.3%), and mass communication and documentation (10.7%) programs.

Table (7)
Unemployment rate among university graduates
of B.A./B.Sc. level by specialization and sex for 1994

Program	Female	Male	Total
Teacher training & education	8.6	12.9	10.0
Fine arts	16.7	50.0	35.7
Humanities	22.4	9.6	15.0
Religion	28.0	9.7	17.9
Social & behavioral science	20.4	18.5	19.0
Commercial & business administration	34.0	12.5	16.2
Law & jurisprudence	26.7	10.8	12.6
Natural science	12.8	13.1	13.0
Mathematics & computer science	29.6	9.8	15.9
Medical & health related	16.3	9.3	11.4
Engineering	27.3	11.3	12.3
Agricultural, forestry & fishery	100.0*	11.5	20.7
Transport and communication	--	0.0	0.0
Mass communication & documentation	20.0*	8.7	10.7
Other	0.0*	8.3	7.7
Total	22.5	11.9	14.6

* Few cases (less than five).

-- No cases

There are differences regarding unemployment rates by specialization between females and males. As table (7) shows, females whom qualifications are university degree of B.A. level, have higher unemployment rates than males for most of the specialization of the same

education level. Females who graduated from the commercial and business administration have the highest unemployment rate (34%). The second highest unemployment rate is among those who graduated from the medical and health related program (29.6%). Females who graduated from the mathematics and computer science program have the lowest unemployment rate (12.8%).

The highest unemployment rate among males of the same level of education is among those who graduated from the fine arts program (50%). While the lowest unemployment rate among males is among those who graduated from the transportation and communication program (0%); followed by those who graduated from the mass communication and documentation program (8.7%).

Unemployment rates by educational authority

Table (8) shows unemployment rates among labor force by educational authority. The highest unemployment rate is among those who graduated from or left educational institutions supervised by private sector (33.1%). The second highest unemployment rate is among those whom educational institutions were supervised by Ministry of Higher Education (24.8%). The surprising finding is that the unemployment rate is very high among those who graduated from the Vocational Training Corporation (24.6%). This is to the contrary to what is believed or prevailed. The lowest unemployment rate is among those who graduated from educational institutions supervised by other than those listed in the table (3.9%).

There are differences between males and females with regard to the volume of the unemployment rates by the educational authority. The highest unemployment rate among females is that among those who graduated from educational institutions supervised by the private sector (53.3%). While the highest unemployment rate among males is that among those who graduated from educational institutions supervised by Vocational Training Corporation (23.9%). The lowest unemployment rates among males and females are among those who graduated from

educational institutions supervised by other institutions not listed in the table.

Table (8)
Unemployment rate by the educational authority & sex (%)

Education Authority	Female	male	Total
None	4.1	5.2	5.1
MOE	23.3	13.5	14.2
MOHE	33.7	17.7	24.8
VTC	50.0	23.9	24.6
Other Govt.	22.1	11.0	14.9
UNRWA	19.5	16.8	16.9
Private	53.3	18.9	33.1
Outside Jordan	22.5	14.1	14.9
Others	0.0	4.3	3.9
Total	29.4	13.6	15.8

Unemployment rate by economic activity

Table (9) presents the unemployment rates among those who had previously worked. The highest unemployment rate is among those who had worked at the extra-territorial organization activities (22.5%); followed by those who had worked in the construction sector (16.3%). The lowest unemployment rate is seen among those who previously worked in the financial intermediation activity (4.1%).

There are differences regarding unemployment rate among females and males who previously worked. Unemployment rates among males go in line with the trend of total unemployment rates by economic activity. While the picture differs among females who previously worked. The highest unemployment rate is among the females who previously worked in the whole sale and retail trade activities (17.6%; followed by those who had worked at the extra-territorial organization activities (11.1%).

Table (9)
Unemployment rate among those who previously worked by economic activity & sex

Economic activity	Female	Male	Total
Agriculture, hunting, fishing & forestry	4.4	5.4	5.4
Mining & quarrying	0.0	6.2	5.9
Manufacturing	9.0	10.0	9.9
Electricity, gas & water supply	0*	4.9	4.8
Construction	0.0	16.4	16.3
Whole sale, retail trade, & repair of motor vehicles	17.6	7.5	7.9
Hotels & restaurants	0*	15.3	15.2
Transport, storage & communication	5.8	9.8	9.7
Financial intermediation	5.9	3.6	4.1
Real estate, reining & business activities	5.3	6.4	6.2
Public administration, & defense	3.9	6.5	6.4
Education	9.7	3.2	6.5
Health & social work	4.9	5.3	5.1
Other community & social services	5.7	5.2	5.3
extra-territorial organization	11.1	23.8	22.5

* Few cases (less than five).

Unemployment rates by occupation groups

Table (10) shows the unemployment rates among those who had worked previously by occupation groups. The highest unemployment rate is among those who previously worked in the craft and related trade workers occupation group (11.3%). Those who worked as legislators, senior officials and managers has the lowest unemployment rate (3.4%); followed by those who had previously worked as professionals (3.8%).

The unemployment rates by occupation groups among those who previously worked differ between females and males. Females who previously worked as technicians and associate professionals have the

highest unemployment rate (9.9). While male who previously worked as craft and related trade workers have the highest unemployment rate (11.4). Females who previously worked as legislators, senior officials and managers has the lowest unemployment rate (0%). While males who previously worked as professional have the lowest unemployment rate (3.3%).

Table (10)
Unemployment rates, among who previously worked, by occupation groups & sex

Occupation Groups	Female	Male	Total
Legislators, senior officials & managers	0.0	3.6	3.4
Professionals	5.2	3.3	3.8
Technicians & associate professionals	9.9	6.1	7.6
Clerks	8.6	6.1	6.8
Service workers & shop & market sales workers	8.7	8.0	8.0
Skilled agricultural & fishery workers	5.3	5.6	5.6
Craft & related trade workers	9.8	11.4	11.3
Plant & machine operators & assemblers	4.8	9.1	9.1
Elementary occupations	6.2	9.5	9.3
Other	0.0	8.0	7.9

Unemployment rate by age groups

Table (11) indicates the unemployment rates among labor force by age groups of 10 years and gender. Labor force in the youngest age group 15-24 years have the highest unemployment rate (28.1%); followed by the labor force in the age group 25-34 years (13.3%). It can be noticed that unemployment rate is almost negatively related to the age groups that makes the unemployment problem is more serious and risky one.

Unemployment rates by age groups among females and males are taking the same trend as in the total. However, the unemployment rates among the first two age groups are higher among females than males. Unemployment rate among females of age group 15-24 years is 54.2%

compared with 23.8% among males of the same age group. Meanwhile, the unemployment rate among females of the age group 25-34 years is more than double of that among males for the same age group. The unemployment rates among females of other age groups are less than that for males for the same age groups.

Table (11)
Unemployment rate by age groups & sex

Age Groups	Female	Male	Total
15 - 24	54.2	23.8	28.1
25 - 34	23.0	10.9	13.3
35 - 44	3.6	7.0	6.5
45 - 54	4.8	8.4	8.3
55 - 64	0.0	7.6	7.4
Else	0*	1.6	1.5

* Few cases (less than five).

Unemployment rates by governorates

Table (12) shows the unemployment rate among individuals of the labor force by governorates. Zarqa Governorate has witnessed the highest unemployment rate compared with the rest of the Kingdom's governorates (19.5%). The second highest unemployment rate is in Amman Governorate (17.3%); followed by Balqa Governorate (16.3%). Tafiela Governorate has the lowest unemployment rate (8.3%).

Unemployment rate varies between females and males by Governorate. Females labor force have higher unemployment rate than males in all governorates, except Tafiela and Ma'an Governorates were the situation is in the opposite. Females as well as males labor force in Zarqa Governorate have the highest unemployment rate (40.3%; 16.3% respectively).

Table (12)
Unemployment rate by governorate & sex 1994

Governorate	Female	Male	Total
Amman	30.0	15.1	17.3
Zarqa	40.3	16.3	19.5
Irbid	26.9	10.7	12.8
Mafraq	23.3	9.3	10.1
Balqa	26.9	14.1	16.3
Karak	20.6	11.2	12.6
Tafiela	3.6	8.9	8.3
Ma'an	9.1	10.3	10.2
Total	29.4	13.6	15.8

Average Period of Unemployment

Period of unemployment by the unemployed individual is another factor that can be used to understand the volume of the supply of labor by educational specialization. It will help in diagnosing the type of educational specialization that have the longest average unemployment period. Thus, it will give the hints for the students to choose the programs that have the lowest unemployment periods; and will help the educational planners to decide upon what programs they have to put emphasis.

Period of unemployment among community colleges' graduates

Table (13) shows the average period of unemployment faced by the unemployed community colleges' graduates until the time of the survey by specialization and gender. The average unemployment period faced by the total unemployed person is 26.9 months.

Table (13)
Average period of unemployment among unemployed community colleges' graduates by specialization & sex
(in months)

Program	Female	Male	Total
Teacher training & education	28.7	26.6	28.4
Fine arts	24.0	31.0	27.2
Humanities	28.7	21.7	27.7
Religion	26.1	29.3*	26.6
Social & behavioral science	33.0	23.8	30.4
Commercial & business administration	30.5	26.6	28.5
Natural science	25.6	18.3	24.0
Mathematics & computer science	32.7	19.9	27.0
Medical & health related	23.6	19.9	21.4
Trade, crafts & industrial	27.0	23.8	24.0
Engineering	16.7	19.7	19.1
Agricultural, forestry & fishery	24.0*	--	24.0
Home economics	18.0*	--	18.0
Transport & communication	36.0*	--	36.0
Mass communication & documentation	44.8	16.3	35.8
Other	24.0*	19.5*	20.4
Total (community colleges)	29.2	22.9	26.9

* Few cases (less than five).

-- No cases

The highest average unemployment period was among transport and communication program's graduates (36 months). The second highest unemployment period was among graduates of the mass communication and documentation program. The lowest unemployed period was noticed among graduates of the engineering program (19.1 months.

The period of unemployment varies between females and males and by type of specialization. The average period of unemployment among unemployed females of community colleges' graduates is 29.2 months compared with 22.9 months among males of the same category. The highest unemployment period is among unemployed females who are mass communication and documentation program's graduates (44.8 months).

While the highest unemployment period among unemployed males is among those who are fine arts program's graduates (31 months).

The lowest average unemployment period among unemployed females is that among those who graduated from the community colleges' engineering program (16.7 months). While the lowest average unemployment period among unemployed males of community colleges' graduates is among those who graduated from the mass communication and documentation program (16.3 months).

Period of unemployment among university graduates (B.A.)

Table (14) indicates the average unemployment period among unemployed individuals of first degree university graduates. The average unemployment period among this category of total unemployed graduates is 19.3 months. The highest average unemployment period is among those who graduated from the mass communication and documentation program (49.3 months); followed by those who graduated from law and jurisprudence program (27.5 months).

The lowest average unemployment period is among those who graduated from teacher training and education science program (13.3 months); followed by those who graduated from the medical and health related program (13.4 months) and mathematics and computer science program (14.7 months).

Average unemployment period differs between females and males and type of specialization. The average unemployment period among unemployed female university graduates is 19.9 months compared with 19 months among males. The highest unemployment period among unemployed females is among those who graduated from the mass communication and documentation program (84 months); followed by those who graduated from the law and jurisprudence program (44.3 months). While the lowest average unemployment period among unemployed females university graduates is among those who graduated from fine arts program (4 months).

Table (14)
Average period of unemployment among unemployed
Universities' graduates (B.A.) by specialization & sex
(in months)

Program	Female	Male	Total
Teacher training & education	12.0*	14.3*	13.3
Fine arts	4.0*	17.8*	15.0
Humanities	17.7	16.2	17.2
Religion	19.6	4.7*	15.1
Social & behavioral science	25.7	20.4	21.9
Commercial & business administration	17.2	14.1	15.2
Law & jurisprudence	44.3*	22.4	27.5
Natural science	14.2	15.5	15.0
Mathematics & computer science	11.4	18.5	14.7
Medical & health related	16.1	11.2	13.4
Engineering	32.0	24.8	25.9
Agricultural, forestry & fishery	10.3*	33.0*	21.7
Mass communication & documentation	84.0*	32.0*	49.3
Other	--	29.0*	29.0
Total	19.9	19.0	19.3

* Few cases (less than five).

-- No cases

The average unemployment period among unemployed males university graduates is 18.9 months that is a little bit lower than that among females. If we discard programs that have few cases, unemployed males who graduated from the engineering program have the highest average unemployment period (24.8 months). While the lowest average unemployment period is among those who are graduated of medical and health related program.

Average Monthly Earning

Average monthly earning from work is another factor that reflects the volume of supply and demand of labor in the labor market. It also gives signals to the students who completed their secondary education to which programs they have to apply, since the average monthly earning of a specialization is one of the factors that affects individual decision regarding what program to enrolled in.

Average monthly earning among community colleges graduates

Table (15) shows the average monthly earning of work among workers who have community colleges diploma by sex and specialization regardless of their period of experience. The average monthly earning of work of the total workers who are community colleges' graduates is JD 152.2.

Table (15)
Average monthly payment among employed community colleges' graduates by specialization & sex (in JDs)

Program	Female	Male	Total
Teacher training & education	118.8	163.1	131.9
Fine arts	142.9	133.9	137.4
Humanities	128.2	152.6	138.3
Religion	101.8	127.6	118.5
Social & behavioral science	124.0	152.0	139.8
Commercial & business administration	167.1	181.9	178.4
Natural science	138.1	158.1	149.1
Mathematics & computer science	123.9	141.7	134.4
Medical & health related	141.2	132.2	135.3
Trade, crafts & industrial	115.0	142.4	141.8
Engineering	91.2	173.5	171.0
Agricultural, forestry & fishery	150.0*	135.9	136.6
Home economics	153.5	750.0*	207.7
Transport & communication	160.0*	390.9	371.7
Services trades	700.0*	100.0*	400.0*
Mass communication & documentation	119.1	130.6	125.6
Other	116.0	146.0	140.0
Total (community colleges)	133.1	162.9	152.2

* Few cases   -- No cases

Average monthly earning from work differs by education specialization. If we discard the programs that have few cases, workers who graduated from the transport and communication programs have the highest average monthly payment (JD 371.7). Those workers who graduated from the religion program have the lowest monthly earning (JD 118.5); followed by those who graduated from the mass communication and documentation program (JD 25.6).

Average monthly earning varies between females and males and by type of specialization. The average monthly income from work among female workers who are community colleges' graduates is JD 133.1 compared with JD 162.9 among male workers of the same category. If we discard the programs that have few cases, female workers who graduated from the commercial and business administration programs have the highest average monthly earning among female community colleges' graduates (JD 167.1). The second highest average monthly earning is among graduates of home economics program (JD 153.5). The lowest average monthly earning among females workers who are community colleges' graduates is among those who graduated from the engineering program (JD 91.2); followed by those who graduated from religion program (JD 101.8).

Average monthly earning of male workers of the same qualification is higher than females for most specialization. The highest average monthly earning is among male workers who graduated from the transport and communication program (JD 390.9); followed by those who graduated from the commercial and business administration program (JD 181.9). The lowest average monthly earning among male workers who are community colleges' graduates is among those who graduated from religion program (JD 127.6).

Average monthly earning among university graduates
The average monthly earning from work is higher among workers who completed their university first degree than community colleges' graduates. Table (16) indicates the average monthly earning among

university graduates by sex and specialization. The average monthly earning among total university graduates of bachelor degree level is JD 240.8. The highest average monthly income from work is among those who graduated from transport and communication program (JD 626.4); followed by those who graduated from engineering program (JD 318.9). The lowest average monthly earning is among those who graduated from the mass communication and documentation program (JD 161); by those who graduated from natural science program (JD 196.4).

Table (16)
Average monthly earning among employed universities' graduates (B.A.) by specialization & sex (in JDs)

Program	Female	Male	Total
Teacher training & education	163.4	153.5	158.9
Fine arts	218.0	156.0	190.4
Humanities	161.6	203.1	186.9
Religion	163.1	186.5	177.3
Social & behavioral science	163.1	230.4	212.5
Commercial & business administration	182.8	262.8	252.1
Law & jurisprudence	110.5	257.3	243.1
Natural science	142.5	232.4	196.4
Mathematics & computer science	177.2	206.4	198.7
Medical & health related	232.8	351.0	316.9
Engineering	145.9	329.3	318.9
Agricultural, forestry & fishery	--	226.1	226.1
Transport and communication	--	626.4	626.4
Mass communication & documentation	257.5*	141.7	161.0
Other	147.5*	247.3	239.0
Total	169.3	262.3	240.8

* Few cases (less than five).   -- No cases

Average monthly income from work varies between females and males by specialization. The average monthly earning among female workers is JD 169.3 compared with JD 262.3 among male workers of the same category, regardless of the period of experience. The highest average monthly earning among females university graduates is JD 232.8 that is among medical and health related program's graduates; followed by

those who graduated from the fine arts program (JD 218). While the lowest average monthly earning is among those who graduated from the natural science program (JD 110.5).

The highest average monthly income from work among male workers who are first degree university graduates is JD 626.4, which is among transport and communication program's graduates. The second highest average monthly income, which is far away down the highest average, is JD 351 that belongs to the medical and health relate program's graduates. While the lowest average monthly income from work is among those who graduated from the mass communication and documentation program (JD 141.7); followed by those who graduated from the teacher training and education science program (JD 153.5).

MAIN FINDINGS AND RECOMMENDATIONS

Following are some of the main findings and some necessary recommendations to reform the education system:

Main findings

1. There is a considerable mismatch between the different secondary education graduates and the type of activities they are performing. Eighteen percent of the industrial secondary education's graduates are working in manufacturing; at the same time, only 14.3% of those who completed agricultural secondary education are working in agricultural activities. A high proportion of vocational secondary education' graduates, except nursing, is working in the public administration activities (centered around 25%).

2. Most of the workers who are community colleges' graduates, with different specialization, are working in education activities. There is a clear mismatch between many specialization and activities, since we notice that there are many graduates of each specialty who spread all over activities.

3. Most of the workers who are university's graduates, with different specialization, are pivoted around two activities which are education and public administration. The other two activities, that come after education and public administration, which attract a significant portion of those graduates are the whole sale and retail trade, and manufacturing activities.

4. There is a clear mismatch between the specialization of the workers who are university's graduates and the activities they are performing. This can be realized from the spread of each specialization over many activities, with lesser degree than it was witnessed among the community colleges' graduates.

5. There are large differences in the unemployment rates among the labor force according to their education level & sex. The highest unemployment rate is among community colleges' graduates (27.3%). The second highest unemployment rate is among secondary education's graduates (16.2%). The lowest unemployment rate is among the labor force with high diploma degree (3.3). The unemployment rates among labor force with primary, preparatory education and university first degree are close to each other; ranging from 14.2% to 15.1%.

6. Unemployment rates differ between male and female labor force and by education level. The highest unemployment rates among male and female labor force are among those who are community colleges graduates (17.1 and 38.4% respectively). The second highest unemployment rate among male labor force is among those with preparatory and secondary education (14.6%); while among female labor force it is among those who completed secondary education (27.2%). The lowest unemployment rate among male labor force is among those with high diploma; while there are zero unemployment rates among female labor force who can read and write and those with high diploma or Ph.D degree.

7. Unemployment rates are higher among female labor force than male labor force for all secondary education specialization, except among graduates of nursery secondary education; where the unemployment rate among males (27.8%) is higher than that among females (18.8%).

8. The unemployment rate among community colleges' graduates differs by specialization and sex. The highest unemployment rate is founded among graduates of the mass communication and documentation program (54.3%). The second highest unemployment rate is among graduates of religion program; followed by the unemployment rate among graduates of the natural science program (table 6). The lowest unemployment rate is founded among graduates of agricultural, forestry and fishery program (5%). The second lowest unemployment rate is among those who graduated from the transport and communication program. In general, the unemployment rates are above the national

level (15.8%) among all community colleges programs' graduates except those who graduated from the engineering (13.7%), agricultural (5%), and transport and communication (7.1%) programs.

9. The unemployment rates among female graduates of all community colleges programs are higher than those rates among males graduates of the same programs. The highest unemployment rate among female graduates is found among those who graduated from the religion program (69.2%). While the highest unemployment rate among males graduates is founded among those who graduated from the mass communication and documentation program ·

10. Although the unemployment rate among university graduates of B.A. level is relatively high (14.6%); but yet it is far away below the unemployment level among community colleges' graduates (27.3%). Moreover it is still below the national level (15.8%). The unemployment rates differ among universities' graduates according to their specialization and their gender. The highest unemployment rate among the total universities graduates of B.A. level is founded among those who graduated from the fine arts program (35.7%). While the lowest rate is founded, other than the graduates of other program, among graduates of teacher training and education science programs (10%).

11. Unemployment rates among labor force differ by educational authority. The highest unemployment rate is among those who graduated from or left educational institutions supervised by private sector (33.1%). The second highest unemployment rate is among those whom educational institutions were supervised by Ministry of Higher Education (24.8%). The surprising finding is that the unemployment rate is very high among those who graduated from the Vocational Training Corporation (24.6%). This is on the contrary to what is believed or prevailed.

12. The unemployment rates among those who had worked previously by occupation groups. The highest unemployment rate among those who previously worked is among those who are craft and trade related workers (11.3%). Those who worked as legislators, senior officials and managers has the lowest unemployment rate (3.4%); followed by those who had previously worked as professionals (3.8%)

13. Labor force in the youngest age group 15-24 years have the highest unemployment rate (28.1%); followed by the labor force in the age group 25-34 years (13.3%). It can be noticed that unemployment rate is almost negatively related to age, which makes the unemployment problem is more serious and risky one.

14. The average unemployment period faced by the unemployed community colleges' graduates is 26.9 months. The average unemployment period differs by specialization. The highest average unemployment period was among transport and communication program's graduates (36 months). The second highest unemployment period was among graduates of the mass communication and documentation program (35.8 months). The lowest unemployed period was noticed among graduates of the engineering program (19.1 months. The period of unemployment varies between females and males. The average period of unemployment among unemployed females of community colleges' graduates is 29.2 months compared with 22.9 months among males of the same category

15. The average unemployment period among unemployed individuals who are first degree university graduates is 19.3 months. The highest average unemployment period is among those who graduated from the mass communication and documentation program (49.3 months); followed by those who graduated from law and jurisprudence program (27.5 months). The lowest average unemployment period is among those who graduated from teacher training and education science program (13.3 months); followed by those who graduated from the medical and health related program (13.4 months) and mathematics and computer science program (14.7 months).

16. The average unemployment period among unemployed female university graduates is 19.9 months compared with 19 months among males. The highest unemployment period among unemployed females is among those who graduated from the mass communication and documentation program (84 months); followed by those who graduated from the law and jurisprudence program (44.3 months). While the lowest average unemployment period among unemployed females university graduates is among those who graduated from fine arts program (4 months).

17. The average unemployment period among unemployed males university graduates is 18.9 months that is a little bit lower than that among females. If we discard programs that have few cases, unemployed males who graduated from the engineering program have the highest average unemployment period (24.8 months). While the lowest average unemployment period is among those who graduated from the medical and health related program.

18. The average monthly earning of those workers who are community colleges' graduates is JD 152.2. Average monthly earning from work differs by education specialization. If we discard the programs that have few cases, workers who graduated from the transport and communication programs have the highest average monthly earning (JD 371.7). Those workers who graduated from the religion program have the lowest monthly earning (JD 118.5); followed by those who graduated from the mass communication and documentation program (JD 25.6).

19. The average monthly income from work among female workers who are community colleges' graduates is JD 133.1 compared with JD 162.9 among male workers of the same category. If we discard the programs that have few cases, female workers who graduated from the commercial and business administration programs have the highest average monthly earning among female community colleges' graduates (JD 167.1). The second highest average monthly earning is among

graduates of home economics program (JD 153.5). The lowest average monthly earning among females workers who are community colleges' graduates is among those who graduated from the engineering program (JD 91.2); followed by those who graduated from religion program (JD 101.8).

20. The average monthly earning of male workers who are community colleges' graduates is higher than females for most specialization. The highest average monthly earning is among male workers who graduated from the transport and communication program (JD 390.9); followed by those who graduated from the commercial and business administration program (JD 181.9). The lowest average monthly earning among male workers who are community colleges' graduates is among those who graduated from religion program (JD 127.6).

21. The average monthly earning of those workers who are university's graduates is JD 240.8. Average monthly income from work varies between females and males by specialization. The average monthly earning among female workers is JD 169.3 compared with JD 262.3 among male workers of the same category, regardless of the period of experience.

22. Average monthly income from work varies between females and males by specialization. The average monthly earning among female workers who are university's graduates is JD 169.3 compared with JD 262.3 among male workers of the same qualification, regardless of the period of experience. The highest average monthly earning among females university graduates is JD 232.8 that is among medical and health related program's graduates; followed by those who graduated from the fine arts program (JD 218). While the lowest average monthly earning is among those who graduated from the natural science program (JD 110.5).

23. The highest average monthly income from work among male workers who are first degree university graduates is JD 626.4, which is among transport and communication program's graduates. The second highest average monthly income, which is far away down the highest average, is

JD 351 that belongs to the medical and health relate program's graduates. While the lowest average monthly income from work is among those who graduated from the mass communication and documentation program (JD 141.7); followed by those who graduated from the teacher training and education science program (JD 153.5).

Recommendations

Jordan's economy is entering into a highly and technology-driven world market place, the current and future challenge for Jordan to keep pace with the changing technologies, markets and competitors. Thus priority must be given to a higher education system that could upgrade the education and skills of Jordan people to an international level. Since only highly skilled and trained people could generate the ideas and innovative approaches which would allow the country to compete successfully. Therefor, the objectives of any education strategy is to build a pool of highly qualified Jordanian with the right knowledge and training to guide and be the driving force in economic development. Following are some of the recommendations to reform the education system specially the higher education system:

1. There is a need to put a set of policies regarding the type and context of secondary education in all streams.

2. Priority should be given to a diversified and need-based higher education system.

3. Review the higher education admission policy to become merit-based admission systems for rationing higher education opportunity for students population.

4. Quality of higher education should become a concern for the government and the public. Quality must be enhanced through an integrated strategy of :
   1) merit-based student admission;

2) matching students numbers with adequate state support and institutional capacity;

3) recruiting high quality staff and providing generous incentives to high performance;

4) maintaining a high staff-student ratio with small group teaching;

5) providing staff development with particular emphasis on teaching-learning techniques and enhancing their knowledge base;

6) implementing student and peer review of teaching; and

7) monitoring academic performance through an external examination system.

TABLE (2): THE PERCENTAGE DISTRIBUTION OF WORKERS WHO ARE COMMUNITY COLLEGE GRADUATES BY THEIR SPECIALIZATION AND THEIR ACTIVITIES FOR THE YEAR 1994

Item	agri-culture	mining & guarding	manu-facturing	gas & water	construc-tion	trade, whole & retail	hotels & restau-rants	trans-port, storage	finance	real estate	public administ-ration	educa-tion	health & social services	other -nity services	private servant	inter-national s	Total No.
teacher training	0.4	-	1.1	-	1.1	1.4	0.4	0.7	0.4	0.4	7.0	83.5	2.5	1.1	-	0.4	285
fine arts programs	-	-	12.5	-	8.3	4.2	8.3	-	-	-	8.3	25.0	4.2	29.2	-	-	24
humanities	1.2	0.4	2.4	-	1.6	4.5	0.4	2.4	4.0	-	5.7	75.1	2.4	2.0	-	1.2	245
religion	-	-	-	-	-	2.9	-	-	-	-	17.6	55.9	-	23.5	-	-	34
social & behavior	3.2	1.6	1.5	3.2	4.8	4.8	1.6	1.6	1.6	-	14.5	54.8	3.2	3.2	-	-	62
commercial	0.9	0.9	11.3	0.4	4.8	20.0	1.7	6.8	9.6	4.4	17.2	10.5	5.4	4.8	0.2	0.7	459
natural sciences	1.6	-	3.1	-	-	3.1	-	1.6	-	-	7.8	79.7	3.1	-	-	-	64
math & computer	0.6	-	12.3	0.6	3.1	12.3	-	3.7	5.6	3.1	7.4	47.5	2.5	0.6	-	0.6	162
medical & health	0.5	-	8.2	-	2.2	18.7	1.6	1.6	-	0.5	3.8	2.2	59.9	-	-	0.5	182
trade, crafts	-	1.0	24.3	3.8	5.7	18.1	1.0	5.7	-	2.9	22.9	8.6	2.9	2.9	-	-	105
engineering	1.5	1.0	12.9	4.5	12.9	14.4	2.5	9.0	-	10.9	17.4	6.0	2.5	4.0	0.5	-	201
agriculture	15.8	-	-	-	-	10.5	-	10.5	5.3	-	26.3	31.6	-	-	-	-	19
economics	-	-	-	-	-	-	9.1	-	-	-	-	90.9	-	-	-	-	11
transport	-	-	7.7	-	-	-	-	46.2	-	-	38.5	-	-	7.7	-	-	13
services trades	-	-	-	-	-	-	-	50.0	50.0	-	-	-	-	-	-	-	2
communi-cation	6.3	-	6.3	-	-	-	-	-	6.3	-	31.3	43.8	6.3	-	-	-	16
other programs	-	-	-	-	4.0	-	4.0	8.0	-	-	64.0	20.0	-	-	-	-	25