INTRODUCTION

Suchitra K. “Classroom learning environment and select affective variables in relation to achievement in physical science of students of single - sex and coeducational secondary schools” Thesis. Department of Education, University of Calicut, 2004
Chapter I

INTRODUCTION

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CHAPTER I
INTRODUCTION

1.1 GROUP DIFFERENCE IN HUMAN BEHAVIOUR AND UNEVEN EDUCATIONAL PROGRESS

Education has become increasingly regarded as a major instrument of social change. On the one hand, education develops the personality and rationality of individuals. The knowledge, skills, interest and values thus acquired through education are expected to bring about certain economic, political and cultural changes in the society and consequently improve their socio-economic status. It is therefore expected that education will bring about reduction of many inequalities that exist in society. Based on this argument, the Universal Declaration of Human Rights has included education as ‘One of the basic rights of every human being’ and the Constitution of the UNESCO diverts its efforts to achieve ‘the ideal of equality of educational opportunity, without regard to race, sex or any distinctions, economic or social’. In the post – independence period in India, not only constitutional guarantees (Bhatia, 1988) have been provided to realise the ideal of equalisation of educational opportunities in the country, but also various educational plans have been developed and implemented to achieve the desired end as early as possible. In spite of the world-wide efforts for removing inequalities that prevail in educational opportunities, uneven educational progress caused by group differences in human behaviour caught the attention of psychologists and educationists. Modern researches have helped to give greater precision and validity of the study of group differences. The alleged deficits and differences manifested by ethnic, sex, language and socio-economic group members led to a renewed recognition that in a democratic society, education should provide for a fullest development of these diverse people.
Gender Issues in Education

Of the varied disparities in human behaviour, gender difference in basic psychological traits has assumed a great significance in modern psychology and gender is considered to be one of the important dimensions contributing to differences in scholastic achievement by educationists. It is now believed that apart from biological reasons causing differences among male and female, disabilities and inequalities have been imposed on women in the total context of a society. Education is considered to be the most significant instrument for changing the subjugated position of women in society. Keeping in view of the goals, intensive effort have been made to make education accessible to girls all over the world by national leaders, missionaries and some philanthropists. The programmes include (i) increasing the involvement of girls and women in various levels of education, (ii) adopting ways and means of preventing wastage and stagnation, (iii) expanding the number of educational institutions, (iv) expanding institutional facilities for girls and women, (v) admitting women students to new and varied academic and professional courses, (vi) increasing the number of women teachers, (vii) improving the system of supervision and inspection of schools and colleges and (viii) strengthening the social support for girls' education. In spite of all the above mentioned efforts, various investigations reveal that imbalance still exists in the educational development of girls all over the world.

1.2 NEED AND SIGNIFICANCE OF THE STUDY

There is a renewed interest in the research in the last two decades on (i) gender difference in school performance especially in science and mathematics and (ii) performance of boys and girls in Single-sex and Coeducational institutions at both pre-college and college level. Sandra (1990) and the American Association of University Women (AAUW, 1992) have observed that there is clear evidence that the educational system is not meeting girls' needs. Although girls and boys enter school roughly equal in
measured ability, twelve years later, girls have fallen behind their male classmates in key areas such as higher level mathematics and measures of self-esteem. Licht and Dweck (1983) after analysing a number of studies from 1960 onwards observed that there are striking sex differences in achievement orientations – (i) girls tend to enter novel situations of intellectual achievement with lower expectations of success; (ii) when success is achieved, girls are less likely than boys to interpret it as due to their intellectual ability; and (iii) girls are more likely to avoid tasks which they have experienced difficulties earlier. Reanalysing the data of National Assessment of Educational Progress Survey (USA), 1978 by Kahle and Lakes (1983), it was reported that the initial interest in science and favourable attitude towards science gradually declines during adolescence stage and girls increasingly develop a restricted view of science; especially a negative view of science classes, and science careers. On the contrary, Greenfield (1997) observes that girls believe that they are also capable of studying science and becoming scientists; that they now participate actively in science classes and interact freely with teachers and gender difference may be due to other social reasons.

American Association of University Women (1995) considers that the educational system is not meeting girls' needs citing gender bias as a major problem at all levels of schooling. In 1990s, only five per cent of about three million scientists in the U.S.A are female (Rosser, 1990). While some people may think this small representation on the part of women in science is natural or acceptable, others insist that our society can no longer afford to use only half the potential of its population. A review of literature related to differences of boys and girls in science performance (Combs & Keeves, 1973; Pelz, 1990; Brickhouse, 1990; and Bob Moon, 2000) reveal the following: (i) in the elementary years, similarities between the sexes in maths and science achievement were found whereas in high school stage, differences in achievement become significant. Both boys and girls have begun to see
science as the domain of males. (ii) Female students tend to be less confident in their science and maths abilities. (iii) Cultural biases have a great impact on a woman's performance in science. (iv) For boys, success in sciences courses can build self-esteem during puberty, but girls must consider their feminine image and social support. They are working against culturally perceived social roles. (v) Even when there are no sex difference in the performance and abilities, girls tend to feel less adequate in maths and science and to have less confidence in their abilities than boys. Attitude towards science are strongly differentiated by the time a student reaches eleven years of age. One of the efforts suggested and implemented in the third quarter of twentieth century in the U.S.A., third and fourth quarter of twentieth century in India and other developing countries is to meet the imbalance in the educational development of girls had been the opening of separate schools for girls.

**Coeducational Versus Single-sex Schooling**

Single-sex education refers to three types of schooling classified according to the gender composition of the school, classroom and teaching staff. The present type of single-sex education is where the entire student body of the school and the teachers are of the same sex. Examples are traditional Christian Convent school for girls or elite boarding school for boys. The next type of single-sex configuration includes a mixed-sex teaching staff. A third type of single-sex education occurs when school buildings are coeducational but all instruction occurs in gender segregate classes. This form of instruction is common in many coeducational schools in developing countries. Provision of single-sex education is of interest for certain justifiable reasons. Equity in education is of essential concern in a democratic society where female participation in schooling is low as in many of the underdeveloped countries. Single-sex education enhances the probability of female school participation. The second point of concern is the comparative performance of boys and girls especially in science and mathematics. Many
educationists and social reformers are of the view that single-sex schools offer an environment that is more conducive to learning than coeducational schools, especially for women; they lead to higher achievement and self-esteem of women, encourage women to pursue traditional male-dominated careers; provide an academic climate for girls to flourish and alleviate some of the disadvantages women may suffer in a coeducational setting (Tidball, 1980; Riordan, 1990; & AAUW, 1992). When compared with girls at coeducational schools, it is reported that all girls' school students participate fully in and out of class; develop measurably high levels of self-esteem; graduate in maths and science fields at 1.5 times the rate of coeducational institutions, exhibit greater satisfaction than their coeducational counterparts in almost all measures of experience such as academic, developmental and personal.

Supporters of coeducation argue that single-sex education is a barrier to successful adolescent cross-sex socialisation. Single-sex educational opportunities may be justified in a very limited circumstance only. A.A.U.W. in 1998 made a comprehensive review of research on single-sex education and reported that there is no evidence that single-sex education is better than coeducation. Several studies found that although single-sex schools seem to have positive effects on girls' achievement compared with coeducational schools, once the findings were adjusted for: student socio-economic status, pre-enrolment ability, selectivity of the school and certain other variables, the differences diminished or disappeared. Studies are still going on in western countries to assess the progress towards gender equity, and seeking answers to questions such as 'Does single-sex education work?, Should we abandon single-sex initiatives?, Does coeducation profit females?' and the like. Lockheed and Lee (1992) observe that most of the studies are conducted in the United States and other developed western countries. Only very few studies have examined single-sex education in developing countries.
Fifth Survey of Educational Research (1988-1992) reported the paucity of studies on women's education in India.

In India, the Secondary Education Commission, 1953, National Committee on Women's Education, 1959 and Report of the Committee on the Status of Women in India, 1974, recommended that coeducation should be adopted as a general policy in primary stage and separate schools may be provided in places where there is a strong public demand for them, and enrolment of girls is large enough to justify separate schools. However, studies on achievement and personality traits of students of single-sex and coeducational schools give inconsistent results also (Saighal, 1980; Rai, 1984). In Kerala where the literacy rates of males and females are high and where girls and boys have equal opportunities for schooling, due to various reasons, single-sex educational institutions are still popular especially in urban areas.

Considering the above factors, the investigator felt that it is worthwhile to explore whether variations exist in boys and girls in single-sex and coeducational institutions of Kerala. Being a student of Chemistry and Physical Science education; and a teacher of Chemistry, it was decided to confine the study to science performance and factors contributing to Physical Science achievement.

For the selection of variables and for chalkling out the design of the investigation, studies related to science education were surveyed. A careful study of (i) the external influences of the science learner from where the learner begins learning, (ii) the characteristic attributes of the learner, (iii) quality of the learning process and the involvement of the learner in the learning process and (iv) the quality and quantity of learning outcomes was made. Besides, the research reports of A.A.U.W. on single-sex instruction were also scanned. It was noticed that besides mental abilities, a learner-centred classroom provide productive environment which in turn promotes meaningful understanding of school subjects (Fraser, 1986; McKea, 1994;
Santhakumari, 1999 and Suchitra, 1999). Also, a desire for learning or intent to learn, that is Achievement Motivation (Simmons, 1968; Jegede, 1994; Fortier, 1995) generalised and course specific attitudes and other affective variables such as self-esteem, adjustment and the like are also considered as determinants of learning and performance. Since only scarce research on the comparative effects of sex-segregated and coeducational schooling is reported from developing countries and research findings of the A.A.U.W. in the U.S.A were reported to be inconclusive and gender inequality in science performance is still a debated question, it is felt the necessity of studying whether classroom learning environment and select affective traits have differential influence on the performance of girls and boys in single-sex and coeducational schools.

1.3 STATEMENT OF THE PROBLEM

The study is entitled as “CLASSROOM LEARNING ENVIRONMENT AND SELECT AFFECTIVE VARIABLES IN RELATION TO ACHIEVEMENT IN PHYSICAL SCIENCE OF STUDENTS OF SINGLE-SEX AND COEDUCATIONAL SECONDARY SCHOOLS”.

1.4 DEFINITION OF KEY TERMS

The important terms used in the statement of the problem are defined below:

1.4.1 Classroom Learning Environment

*Classroom Learning Environment* for science learning is defined as the atmosphere and general environment in the classroom that may help or hinder the learning process. This includes physical and material resources, emotional tone and attitude of teacher, social attitude of peers, rules and regulations (Howes & Howes, 1982).
1.4.2 Affective Variables

The term refers to a class of variables which represent affective or feeling traits. The term is operationalised by measures of Achievement Motivation, Self-Esteem and Attitudes.

1.4.3 Achievement in Physical Science

Achievement in Physical Science is defined as the tangible accomplishment or proficiency of performance in Physics and Chemistry as measured using a standardised test.

1.4.4 Single – Sex and Coeducational Secondary Schools

The students who are studying in the secondary classes namely Standard VIII, IX and X are called secondary school students. Based on sex enrolment, schools are categorised as Single-sex or Coeducational. In the coeducational school, boys and girls receive education together in the same classes of the same institution whereas single-sex schools are either all-girls or all-boys schools.

1.5 VARIABLES OF THE STUDY

The variables included for the present investigation are the following:

1.5.1 Independent Variables

For the present investigation, Classroom Learning Environment, Achievement Motivation, Self-Esteem, Attitude towards Science and Attitude towards Academic Work are treated as independent variables.

1.5.2 Criterion Variables

Achievement in Physics, Achievement in Chemistry and Achievement in Physical Science (total) are treated as criterion variables.

1.5.3 Basal Variables

Sex of the students and Type of schools based on sex enrolment namely, Coeducational schools and Single-sex schools (all-girls / all-boys schools) will be treated as basal variables.
1.6 OBJECTIVES

The main objectives of the present study are the following:

(i) To study the main effect of each of the five select independent variables on Achievement in Physics of boys and girls of Single – Sex and Coeducational secondary schools.

(ii) To study the interaction effect of each of the five select independent variables, Sex and School type on Achievement in Physics.

(iii) To study the main effect of each of the five select independent variables on Achievement in Chemistry of boys and girls of Single – sex and Coeducational secondary schools.

(iv) To study the interaction effect of each of the five select independent variables, Sex and School type on Achievement in Chemistry.

(v) To study the main effect of each of the five select independent variables on Achievement in Physical Science (total) of boys and girls of Single – sex and Coeducational secondary schools.

(vi) To study the interaction effect of each of the five select independent variables, Sex and School type on Achievement in Physical Science (total).

(vii) To predict High –; Average –; and Low–Achievers in Physics using the variables Sex of the subjects, Type of institutions based on sex enrolment and five select independent variables.

(viii) To predict High –; Average –; and Low–Achievers in Chemistry using the variables Sex of subjects, Type of institutions based on sex enrolment and five select independent variables.

(ix) To predict High –; Average –; and Low – Achievers in Physical Science using the variables Sex of subjects, Type of institutions based on sex enrolment and five select independent variables.
1.7 HYPOTHESES

The following hypotheses are proposed to be tested for the present study:

(i) The main effect of each of the five select independent variables namely, Classroom Learning Environment; Achievement Motivation; Self-Esteem; Attitude towards Science and Attitude towards Academic Work and Sex and School type on Achievement in Physics of secondary school students will be significant.

(ii) The interaction effect of each of the five independent variables Sex and School type on Achievement in Physics will be significant.

(iii) The main effect of each of the five select independent variables namely, Classroom Learning Environment; Achievement Motivation; Self-Esteem; Attitude towards Science and Attitude towards Academic Work and Sex and School type on Achievement in Chemistry of secondary school students will be significant.

(iv) The interaction effect of each of the five independent variables, Sex and School type on Achievement in Chemistry will be significant.

(v) The main effect of five select independent variables namely, Classroom Learning Environment; Achievement Motivation; Self-Esteem; Attitude towards Science; and Attitude towards Academic Work and Sex and School type on Achievement in Physical Science (total) of secondary school students will be significant.

(vi) The interaction effect of each of the five independent variables, Sex and School type on Achievement in Physical Science (total) will be significant.

(vii) High —; Average —; and Low—Achievers in Physics can be significantly discriminated by means of select set of independent variables namely, Sex, School type, Classroom Learning Environment, Achievement Motivation, Self-Esteem, Attitude towards Science and Attitude towards Academic Work.
(viii) High –; Average –; and Low – Achievers in Chemistry can be significantly discriminated by means of select set of independent variables namely, Sex, School type, Classroom Learning Environment, Achievement Motivation, Self-Esteem, Attitude towards Science and Attitude towards Academic Work.

(ix) High –; Average –; and Low – Achievers in Physical Science can be significantly discriminated by means of select set of independent variables namely, Sex, School type, Classroom Learning Environment, Achievement Motivation, Self-Esteem, Attitude towards Science and Attitude towards Academic Work.

1.8 PROCEDURE

1.8.1 Sample

The study was conducted on a sample of 946 students studying in class IX of secondary schools in Thiruvanthapuram, Malappuram and Kozhikode districts of Kerala State. The sample of the study was selected using proportionate stratified sampling technique by giving representation to sex, locale, school type, instructional efficiency and type of management of schools.

1.8.2 Tools

The tools used for collecting data regarding the variables are the following:

i) Scale of Classroom Learning Environment (Usha and Suchitra, 2002)

ii) Scale of Achievement Motivation (Pillai and Salim Kumar, 1994)

iii) Self-Esteem Inventory (Battle, 2000)

iv) Scale of Attitude towards Science (Pillai, K.S., 1980)

v) Scale of Attitude towards Academic Work (Usha and Suchitra, 2002)

vi) Test of Achievement in Physical Science (Usha and Suchitra, 2002)

1.8.3 Statistical Techniques Used

The statistical techniques used for the study are the following:

i) Three-way ANOVA with $3 \times 2 \times 2$ factorial design
ii) Scheffé Test of Multiple Comparison
iii) Test of significance of difference between means
iv) Discriminant Function Analysis

The analysis were specifically designed to throw light on the objective and hypotheses set for the study.

1.9 SCOPE AND LIMITATIONS OF THE STUDY

There is renewed interest for the research on gender differences, single-sex education and single gender / mixed gender grouping in science learning in developed countries. The present study attempts to examine whether variation in Classroom Learning Environment and select affective variables of secondary school boys and girls studying in Single-sex and Coeducational secondary schools affect variation in Achievement in Physical Science. An attempt was also made to study the single effect as well as the combined effect of gender and school type along with the select variables on achievement separately for Achievement in Physics, Chemistry and Physical Science.

Owing to practical consideration, the following limitations are anticipated for the present investigation:

(1) The accessible population of the study was confined to students of Standard IX.

(2) The selection of variables was confined to only five variables: Classroom Learning Environment and four affective variables.

(3) Achievement in Physical Science was intended to measure the instructional objectives of cognitive domain only and only objective type test items were included in the test.

(4) The methodology used for examining the association of the select independent variables and Achievement in Physical Science and the possible gender and school type differences, is three-way Factorial ANOVA followed by post hoc comparison.
(5) No attempt was made to study the component dimensions of the independent variables especially Classroom Learning Environment, Self-Esteem and Achievement Motivation.

(6) No factor comparison of variables between boys and girls of Single-sex and Coeducational schools was attempted.

(7) Sample was confined to three representative revenue districts of Kerala.

1.10 ORGANISATION OF THE REPORT

The report has been presented in five chapters.

Chapter I: Introduction, deals with rationale behind the problem, its need and significance, statement of the problem, definition of key terms, variables, objectives and hypotheses, procedure and scope and limitations of the study.

Chapter II: deals with a theoretical overview of the variables and review of related studies.

Chapter III: gives the design of the investigation namely variables, hypotheses and methodology.

Chapter IV: deals with analysis part of the study, conclusions and interpretations.

Chapter V: Comprises an overview of the study, major findings, tenability of hypotheses, suggestions for improving educational practices and suggestions for further research.