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Gender equity : retrospect and prospect, with recommendations for the School of Education: part 2: a curriculum for girls

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GENDER EQUITY : RETROSPECT AND PROSPECT
WITH RECOMMENDATIONS FOR THE SCHOOL OF EDUCATION

PART 2: A CURRICULUM FOR GIRLS

By Lesley P Newhouse
WA College of Advanced Education
Department of Education Studies
Nedlands Campus
May 1990

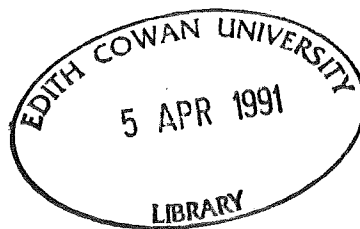
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CURRICULUM AWAKENERS Definitive statements by Newsom, 1948; Cooper, 1968; Green 1976; Sutherland 1981; and Parker & Offer 1989, have had a profound influence on the orientation of Part 2 of my report on the "Curriculum for Girls" in Australia over the past twenty two years.

John Newsom, (1948) A quotation which made a deep impression on me was that of Newsom:

"and so the great work goes on, wrote John Newsom of British girls' grammar schools in 1948, "... and we produce little parrots, who can tell you the Main Clauses in the Treaty of Utrecht or give you in a hundred words a thumb-nail sketch of poor Shylock, who can solve a quadratic equation, but the integration of whose personalities has been deliberately retarded" (Benn 1970:16).

We should, according to Newsom, be concerned not only in transforming girls from being reproductive learners into productive creative learners, but, also, with actively enhancing their personalities. These two major goals I believe, from an extensive review of the literature, are inextricably linked.

Nance Cooper (1968). Twenty one years later in Australia, Newsom's ideas resurfaced in a definitive paper by Nance Cooper on "The Education of Women" where she stated:

"At no time has any educational reformer in this country consciously sat down and thought through to a scheme of education that would enable girls, as girls, to really reach full intellectual and emotional maturity with the least possible suffering". (Cooper, in McLean 1969).

It was she who produced vital statistics relating the education of girls to their economic situation and the attitudes that prevailed against their achievements at school and into adulthood.

Maxime Green (1976): writing from the American perspective, in the mid seventies, saw the need for women and girls to be actively involved in determining their own destinies and how with growing confidence and competence, individually and collectively, this was beginning to be achieved:

"The old separations still exist, as do many of the old inequities. They are being eroded now, as the consciousness of women changes and having changed seeks out expression in the public space ... there are new choices to be made by individual women and by women in their networks and associations. There is a new generation of women rising, a new generation that must be moved to critical reflection upon their own situations so that they may achieve their own awakenings". (Green, 1976:29).

Margaret Sutherland (1981) in her book Sex Bias in Education made a pertinent comment with regard to the education of boys in Britain:

"It would be unreasonable to suggest that changes are to be made only for the benefit of girls' education. From what has been said so far it emerges that boys also are far from receiving the ideal education" (Sutherland 1981:201-204)

Lesley Parker and Jenny Offer, (1989) made the statement that innovations in the Science Curriculum for Girls have much to contribute to the science curriculum for all students, reflecting a growing confidence in the value of the women's perspective and women's ideas for true gender inclusive curriculum.

"For some years now science education in relation to girls has been a focus of American, British and European research. While initially the concern was with the importance of science to girls, more recently the emphasis has shifted somewhat to examine also the importance of girls to science" (Parker & Offer 1989:918).

COMMENT:

There has been kernel of a notion of "a curriculum for humankind" underlying the development of the curriculum for girls over the past twenty-two years in Australia. This world view is expressed clearly in the writings of Green (1976); Spender (1982); Gilligan (1982) and Noddings (1984). Writings that emphasis caring, ethics, a recognition of human dignity and stewardship of our planet earth.

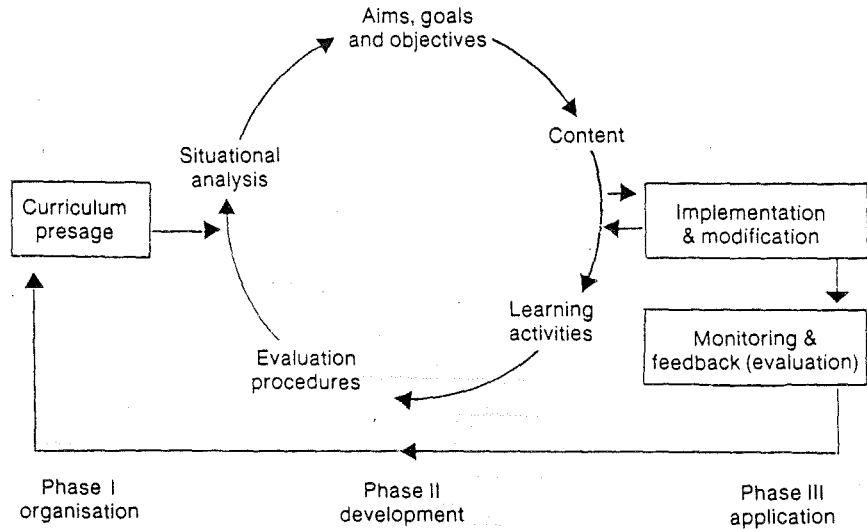
There has been a strong view that women collectively unite and contribute with heart and mind and skills to improve education for girls, choice of adult roles and the condition of women world wide. This is paralleled by learned research, "action research" and a consistent scholarly critique of "great man" research, "masculine" knowledge, and a questioning of its underlying philosophy and ideology. At both the micro and the macro levels of research it is the women's hope that barriers may be broken down to include the lost "femininity" balance needed in the pursuit of knowledge, truth and ultimately social relationships. Social relationships that uphold the dignity and uniqueness of each human being, male or female, in every culture.

There has been an urgency and a zeal inherent in feminist intellectuals to achieve this vision both in the Humanities and Science, and it is more and more evident in ordinary women and is quite unparalleled in history. Over the past twenty two years at every level of the curriculum for girls, there have been fruitful outcomes which can be observed most clearly in the production of new knowledge, reports, critiques of "masculine" knowledge, innovations in the classroom, guide-lines for classroom interaction, and detecting bias and lack of gender inclusiveness in resources. It is also evident in the growing confidence and competence in women and girls in what they can offer to society and education in particular.

An unanticipated outcome in the development of a curriculum for girls is the potential for strong mutual linkages between the educational institutions at all levels within our society, where their unique contribution to the education of girls is recognised.

A NEED FOR MODELS TO ATTEMPT TO UNDERSTAND THE HEIGHT, BREADTH AND WIDTH OF CURRICULUM FOR GIRLS, WOMEN AND ULTIMATELY HUMAN KIND:

PRINT'S MODEL OF CURRICULUM DEVELOPMENT:



I plan to use the curriculum development model of Print (1989) since it offers a framework to organize and collate the enormously diverse body of material written and researched on the education of girls and women. This model has great flexibility for the researcher, evaluator and educator to perceive curricula:

concurrently (eg. in Universities, CAES, TAFE and Schools);

historically (ie major phases of curriculum development for girls, 1968, 1975, 1985, 1987);

in terms of future possibilities (eg. Gender inclusiveness and inclusiveness per se. in the 1990's);

with regard to female needs, interests and ability in particular racial and social groups at every age (eg. Pre-schoolers, primary, secondary, post school, middle age, elders);

in relation to situational analyses and needs assessment at the macro and micro levels (eg. Economic needs and social attitudes at the Societal level compared and contrasted with current individual needs and attitudes at the educational institution and classroom levels);

and finally in relation to the three sequential phases of schools' curriculum development for girls, namely organization, development and application where:

- (a) we need to understand what happened as a prelude to development (Presage)
- (b) how we are to devise a curriculum document, project, or materials (development)
- (c) how the document may be applied and modified in practice. (application).

A great strength of the Print model is that he accommodates in the Presage, the nature of the Curriculum Developers at each phase. This has helped the writer to identify the philosophical assumptions and ideologies (Print 1989:53) which underlay the major thrusts in the curriculum for girls at that time and at every level of the education system.

Eg. the stabilizing traditional structural functionalist perspective of 1968; the predominant conflict Marxist perspective for change 1975-89 at the macro level and the complementary "social interactionist" perspective in the classroom with a sense of promoting student empowerment within the established school system.

Curriculum Presage and "taking stock" at intervals:

Print's model is fluid and flexible, the Curriculum "presage" inclusion enabled the researcher to retrospectively and currently "take stock" at intervals (Reference: Reports and Policies on girls 1975, 1985, 1987) and to confidently move forward to address new or modified needs of girls.

Seemingly emerging from the "presage" preceding each new phase in the curriculum for girls and women in Western Societies is the accelerated production of "feminist" knowledge both pure and integrative at the scholarly level (eg. 1970's compared with 1980's see Mares 1989).

The resulting products are not only learned books and treatises but the production of curriculum packages that reflect the "readiness" for the next phase in the development of curriculum for girls. (Eg. Girls into Mathematics (Vic) 1984; GIST (UK) 1980; GANAST 1988; PEP 1987).

The Three Phases of Curriculum Development - Organization, Development and Application - a Recurring Theme:

Ausubel (cited in Joyce and Weil 1980:81) wrote of "progressive differentiation" and "integrative reconciliation" as key concepts are redefined in disciplines. This was the intuitive feeling I had about the use of the three phases in The Print Model in enabling the researcher to identify the points of redefinition and fresh emphases in the development of girls' curricula (eg. "Non Sexist Education 1975; the Gender Agenda 1984; Gender Inclusive 1989).

There is the hope for the 1990's that true integrative reconciliation between the traditional curriculum and the new specialist curricula can flow effortlessly in the future gear of "inclusiveness" per se (that is, encompassing again the satellite curricula of the girls, the gifted, the Aboriginal, multicultural and special education into the 'Inclusive Curriculum' planned by the Ministry of Education in Western Australia).

It is possible then through the Print Model, to perceive curriculum as transformative and by using current data (eg. the latest two editions of the Australian Science Teacher's Journal) to project to the future and create a "Model Curriculum for Inclusiveness" that encompasses the germs of a new balanced philosophy and ideology; a true historical background to the disciplines, the characteristics of students emerging; the current needs being addressed; the teaching strategies used and the most suitable evaluation required. In 1990, it is easy to become euphoric, but much needs to be implemented in schools to reduce the invidious effects of sex role stereotyping which are detrimental to all people in the teaching-learning process at every level.

1990 is a phase where special attention needs to be given to the strengths of girls and boys, with a concerted effort to alleviate, remediate and raise weaknesses to a balanced level of strength. Girls still require special provision (Foster 1989:20), though boy's classroom behaviour is becoming an increasing challenge in pastoral care and management (Mahoney 1985)

Curriculum Design

"An essential feature of a curriculum is the conceptualization and organization of its various parts ... these elements are the "essential building blocks of any curriculum. By organizing curriculum elements in particular ways, different designs emerge". (Print 1989:15).

The Print Model (1989:40) identifies five contexts of Curriculum that he describes as:

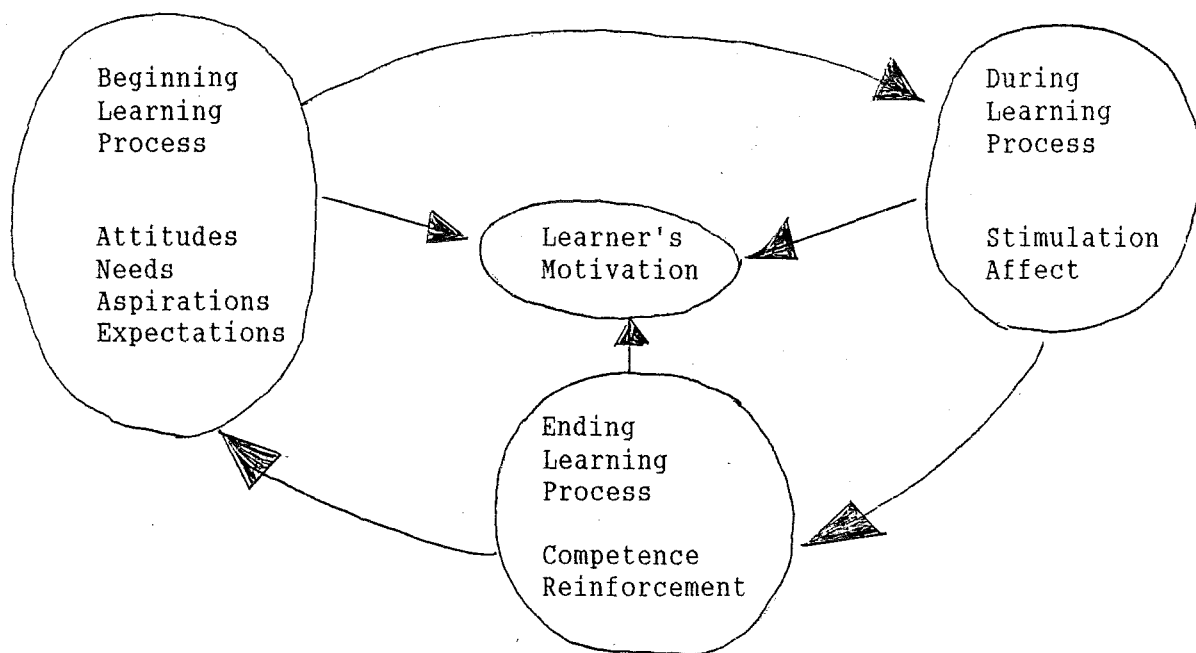
1. Systems Curricula, eg, all schools in Western Australia
2. Subject Curricula eg, Science, Computing, Maths curricula
3. "School" Curricula eg, totality of school offerings
4. Subschool curricula, eg, Pre-primary; Upper Secondary
5. Project Curricula, eg. A Gender Inclusive Curriculum

Clearly with the Education of Girls a sixth context is imperative and related to the Hidden or Covert Curriculum. Evans (cited in Leder and Sampson 1989:73) identifies this curriculum context in the school as the "Living Curricula", where clearly there are concerns about creating awareness concerning gender and developing skills particularly for parents and teachers.

Hildebrand (1989:9) also provides a model for developing and investigating an appropriate curriculum for girls particularly in Science.

The Curriculum and Personality Development of Girls:

As we are also concerned with the personality development of girls, (Newsom 1948; Cooper 1969) of which motivation is a vital component, it is helpful to include Wlodkowski's (1982) model of motivation and teaching. This model may be applied to the classroom environment and incorporated into the several levels of curriculum interaction indicated by Print (1989).



MOTIVATION IN THE LEARNING CYCLE

Adapted from
Wlodkowski 1982

A knowledge of the needs, attitudes, aspirations, expectations, feelings, interests, beliefs and values and the way each affects the motivation of girls will naturally require close consideration before, during and after a lesson. This model may also be used to evaluate how far girls' and women's sense of confidence and competence has advanced over the past twenty-two years of the Curriculum Development for Girls.

Professional Development of Women Teachers:

A parallel curriculum has emerged from a focus on the education of girls and that is the professional development of teachers, particularly women. This has been generated not only to educate women teachers in gender issues, but to equip them for the so necessary changes required in school organization and the visibility of women in the school in leadership positions. Professional development has ranged from "mentor advise" to whole curriculum packages. The latest packages also include the inservicing of parents - a "curriculum for parents" (eg. GAMAST 1988).

Vertical and Horizontal Connections (Print 1987).

It is possible to accommodate the notion of vertical and horizontal connections in the five levels incorporated in the Print Model. It is clearly evident from the readings that the "Curriculum for life" of women and girls is strongly melded with formal education for girls and women at the institutional and classroom levels. One finds that there is a dissemination of "feminine knowledge" to all women through the popular media. (eg Spender "Cosmopolitan" 1989). A sense of collective consciousness amongst women at all levels has facilitated the growth of competence and confidence during the past twenty-two years of this satellite curriculum for the education of girls and women.

One of the major weaknesses of the Print Model for Curriculum Development in the Education of Girls, is related to the absence of a 7th level of a "Curriculum for Human Kind". A level that subsumes all others and represents a world view where human dignity and mutual caring are emphasised for all peoples (so clearly expressed and developed in the writings and seminars of Dr Spender between 1975 and 1989).

Creating Classrooms for Equity:

In the past twenty two years, classroom environments have been progressively modified for gender equity. This refinement can be accommodated in the Print Model in terms of attention and re-attention to the needs of girls, scrutiny of resources (non sexist, sex fair, gender inclusive), creating physical environments and focus on patterns of classroom interaction or the minutiae of interaction. These concerns have blossomed into precise focussing on preferred learning styles and appropriate teaching strategies (1975, 1984, 1989).

Revision of Curriculum Content and the Birth of New Disciplines: (See Print Model 1989 and Klein (1989)).

"The questioning of how curriculum content gets legitimized as knowledge would seem to be a critical concern for equity" (Secada 1989:75)

Bruner and Piaget's theories on the epistemology of knowledge can be accommodated in using Print's three phase model of curriculum development. The growth of new integrative disciplines in the schools and CAE's is evident as a result of progressive implementation and evaluation in the institutions (eg. Career Education, Home Economics, Early Childhood Studies, and Craft Design and Technology). There is evidence, too, of the questioning of established disciplines in the universities, evidenced in the ever expanding "height, breadth and depth" of emerging reconstructions of knowledge as a direct or indirect outcome of active curriculum development for girls and women. (Mares 1989).

"Women's Studies" has emerged after twenty-two years of "satellite curriculum for girls" innovations. From a difficult birth and intense growing pains, "Women's Studies" has "come of age", as an integrative discipline, so very much a part of holistic feminine philosophy, ideology and morality. (Gilligan 1982; Noddings 1984; French 1986).

Bias in curriculum materials, with an emphasis on Gender Inclusiveness, is still a matter of concern particularly in the 'hard' sciences. (Rennie & Mottier 1989).

Spirals of Curriculum - (1968-1990)

As I reflect both holistically and addressing singular aspects of the curriculum for girls, there are images of spirals of curriculum (after Bruner 1966) with a sense of moving from simple beginnings in the education of girls to the "heart of the matter" as objectives are refined, attitudes change and concepts become more complex. This is reflected in title changes to curriculum (for instance, "non-sexist", "sex fair", "girls", "gender", "gender inclusive"). Print's (1989) Model clearly indicates the need for implementation, evaluation and modification as necessary.

Teaching - Learning Strategies:

There is a need for a supplementary model of the teaching learning situation to accommodate for the inter melding of the affective and cognitive domains so evident in the curriculum for girls. The best model is Wlodkowski (1982) Model of Motivation in the classroom (cited in Woolfolk 1987:320).

An initial diagnosis (Newsom 1948) of the personality and motivation of girls and their attitudes and needs has led to the assimilation and integration of teaching strategies that are particularly suited to girls, the promotion of human dignity, and cooperation. The leading role of the affective domain in determining the suitability of teaching strategies for girls in science, for example, has led to an integration of strategies previously reserved for the Arts, Industrial Arts and the gifted. A seed sown by Professor Bronowski with role playing of the DNA Model by children in the "Ascent of Man" television series. (See examples in Australian Science Teachers Journal August 1989).

The emphasis on teaching strategies which stress human dignity, social issues, co-operative learning, and are of a predominantly investigative nature, has led to an acknowledgement of the way such strategies can facilitate both individual and group productivity, creativity and excellence. (See Joyce & Weil (1980) In essence there is a true regard for holistic balance in learning at every level and a synthesis of teaching and learning strategies (ie. from personal to the highest world view).

Research, Evaluation and the Adequacy of the Use of the Print (1987) and Wlodkowski (1982) Models in the Curriculum Development for Girls:

There is a strong sense in the review of the research into girls' education, that women have collectively united and contributed with heart and mind to the improvement and reconstruction of curricula for women and girls world-wide. This has led to a mutual valuing of contributions by women at every level of the curriculum development - and can be clearly demonstrated by using both the Print and Wlodkowski models. This mutuality has led to a recognition of the cognitive contributions made by teachers as "action researchers and adult learners" in their school by their academic mentors who are primarily concerned with "a consistent scholarly critique of the 'great man' research". Greatest progress in the education of girls has been made where women at every level of the formal education system meet at vital "presage" times, then publish and disseminate the findings of the preceding phase.

The resulting products, as mentioned earlier, are learned books, treatises and curriculum packages that reflect their readiness for the next phase in the development of the curriculum for girls. (See The McClintock Collective 1989:128).

Recent analysis has revealed the predominantly "masculine nature" of the pure sciences (Kelly 1985). This has opened the debate on the need for: balance between masculinity and femininity in each person; a critical evaluation of every facet of curriculum practice in science; questioning scientific knowledge itself with its masculine epistemology and emergence as "the truth" (Cross 1989).

Evaluation and Equity:

"A conceptual framework is required to facilitate measurement, progress and the very meaning of equity". (Harvey & Klein in Secada 1989).

Print (1989:141) goes some way in helping the researcher and educator to address all these aspects of the evaluation of the Curriculum for Girls, vertically, horizontally and in the long term. This is provided that evaluation is viewed in the context of equity and the dignity of the individual (Harvey & Klein 1989). However, his model does not readily accommodate to the productivity and the emergence of new integrative ways of thinking about the curriculum itself. There is a need therefore to incorporate into the Print Model a corresponding cycle of affectivity (Wlodkowski 1982), which can in "partnership" integrate and reconcile new developments in both the formal curriculum and hidden curriculum as they arise. It is also essential that curriculum developers in Girls' Education, look back at developments in the "traditional" curriculum since the "time of separation" (circa 1979) lest they fall into the trap of "reinventing the wheel" alone and not in harmony with men and women who have remained in mainstream curriculum development especially between (1979-89).

Harvey and Klein in Secada 1989:68 see Educational Equity as a "check on the justice of specific actions that are carried out within the educational arena and the arrangements that result from these actions".

For example, there is a recognition in the education of girls that our assessment procedures, particularly at upper school, severely limit the recognition of productivity and higher levels of thinking. A sense of unfairness is creeping into the minds of young people, as adults continue to determine what shall be deemed prestigious knowledge. (Usually pure subjects such as mathematics, masculine sciences, the law and computing rather than applied, integrated or arts subjects).

Action research that is diagnostic, remediating and productive requires the broadest evaluation procedures possible with a focus on input, process and output. For example, at the Societal level economic and educational relationships for women and girls have been and are closely monitored and analysed for equity. (deLaeter et al 1989). At the school level, the behaviour of girls, boys, teachers, parents and administrators as the "microcosm" of society is also closely scrutinized by both "minutiae" and "holistic" modes of evaluation.

Models, Check-lists and Guide-lines to evaluate equity:

Increasingly, general models (Harvey and Klein 1989) and Specific Guide-lines (Iowa State Dept of Public Instruction 1986, WA Education Department 1989) are being produced for evaluating curricula for equity.

Looking Ahead: Life Long Education for Women and Men:

Print's Model clearly shows the progressive differentiation and reconciliative integration (reference Ausubel) that more and more underlies the transformative curriculum development for girls and women. As educators, these curriculum developers have opened our eyes to the need for life-long education and concern for equity. Their programmes have shown how we all require professional and personal development to meet every stage of our life cycle.

It is no longer a luxury, but a necessity to educate people if human dignity and productivity is to be enhanced throughout the life span. It is the vision of curriculum developers of girls and women that the education for life in our society may finally outreach to the world curriculum of life and living to promote human dignity and productivity in all peoples. (Spender 1989).

Curriculum Orientations for the Education of Girls:

I propose to view the curriculum in each of the 5 ways proposed by Print (1989:43) and a sixth way conceived by Conway, (cited in Cross 1989:40)

1. Academic Disciplines Approach
2. Humanistic Conception
3. Social Reconstructionist Conception
4. Technological Conception
5. Eclectic Conception (ref Eisner and Vallance 1974; McNeil 1981, cited in Print 1989)
6. Spiritual, aesthetic conception (Conway cited in Cross 1989).

GENDER - INCLUSIVE CURRICULUM - a transformed balanced curriculum:

Definition:

There has been progressive refinement of the concept pertaining to equity for girls 1981-89 as a result of action research, meticulous evaluation and dissemination of the findings. (Secada 1989)

The term sexually inclusive curriculum was first introduced by Jean Blackburn in 1981, when she pointed out the need to include the contributions of women in the school curriculum. Later on inclusive was defined as a term to describe something which includes all groups in one society and challenges the status quo in which experiences of the Anglo Australian male are regarded as the norm. (Bransom et.al 1979; Equal Opportunity Unit 1985).

Currently, Gender Inclusive Curriculum has been re-defined nation wide as:

"Curriculum which in its content, language and methods gives as much value and validity to the knowledge and experiences of girls and women as it gives to boys and men". ASTA (1987:19).

The Ministry of Education in Western Australia issued a policy directive in 1989 stating that "inclusive curriculum" is a priority of the Ministry of Education acknowledging its concerns that there be equitable educational outcomes for all students "... it is a specific model of curriculum that is deliberately employed to ensure that schools provide an education that is relevant and beneficial to all students so that they gain the knowledge and understanding necessary to participate competently and confidently in Society" and "necessitates an approach which considers the needs of every student and which includes staff, students and community in the development and validation of the curriculum".

Thus Western Australians are placing "gender inclusive" under the broad umbrella of "inclusiveness". Idealistically this is encouraging since it pre-supposes that "satellite" curricula like "Aboriginal Education" and "Education for Girls" will now be considered equitably for their valued contributions to real "inclusiveness" in the 1990's.

What the policy directive fails to address is the crucial need for professional development of educators at every level of the education system ... the notion of a parallel curriculum for the adults with regard to "inclusiveness".

MAJOR STAGES IN THE DEVELOPMENT OF GENDER INCLUSIVENESS IN THE SCHOOL CURRICULUM IN AUSTRALIA, WITH CONSIDERATION OF INITIATIVES IN UK, USA AND OTHER COUNTRIES:

Research Sources:

The writer initially concentrated on Australian, UK and USA research (ERIC; AEI and BEI) since these were countries with a similar ideology. Later it seemed important to draw on findings in the field of comparative education and the growing number of publications from other parts of the world. Finally of infinite value were books related not only to educational innovations but to the life and culture of that society.

Australian Curriculum for Girls:

Based on Print's 1989 three phase model and Wlodkowski's (1981) learning and motivation model, this curriculum for girls may be perceived as a twenty two year pilot, satellite curriculum.

Phase I:

1948 John Newsom - an intuitive recognition that middle class grammar school girls' education was reproductive regurgitation and stunting personality growth.

1968 Nance Cooper observed:

"Australian attitudes have never been actively anti-feminine merely negatively apathetic"

She expertly analysed statistics related to Girls, their education, employment prospects and changing female roles. Cooper highlighted the anachronistic nature of the curriculum and the need for a "curriculum for girls, as girls".

Major focus on sex bias in teaching materials, resources encountered in schools.

1975 Culmination of Phase I, Presage for Phase II "Girls' Schools and Society" Report identified major areas of concern in "sex bias" in education, drawing on statistical trends here and overseas and identifying the slowness of attitude change.

1976 Maxine Green - positive evaluation of the growth of women, creating their own "awakenings".

1981 International Girls, Science and Technology Conferences (Parker 1989:118)

1981 Eleanor Ramsay "The Key to equality of opportunity and outcome for girls in education is classroom interaction and management".

1980- Building self esteem, confidence and competence is a priority for
1982 girls (Dynam 1980; Smith & Marsh 1981; Taylor 1981/1982).

1983 The foundation of the Science Teacher's Collective, which highlighted major issues of social justice, gender and the nature of science itself. Clear set of objectives to achieve gender inclusiveness in the science curriculum. (McClintock Collective 1989:133)

1973 - The growth of field methods in the study of education -
1985 ethnography and gender (Davies L 1985).

1984 - Has been an era of "sex-fairness", where sex fairness was defined
 1989 as:

"the correction of sex bias and discrimination in all aspects of the curriculum, particularly evident in Australian and American research. UK research has tended consistently to encourage re-examination of gender in the light of current ethnic, cultural and economic concerns".

1984 "Girls and Tomorrow" Report reviewing past achievements, current research and recommendations for a National Policy for the Education of Girls - particularly in Science, Mathematics, Technology and Sport, which are conceived as "masculine domains" of study.

- 1985 o Klein (USA) produced a handbook for achieving sex equity through education.
- o Concern for boys' behaviour, learning problems and teacher interaction. (Mahoney 1985; Croll 1985).

Phase III:

1985 - o The beginnings of seriously developing gender inclusive
 1986 school policies, "with a solitary co-educational high school challenging complacency towards gender bias" (Trevaskis 1985; McDonough 1986)

- o Debate about inclusion of "Women's Studies" in High Schools (Yates 1986)
- o Creation of girls only groups especially in "masculine" subjects. (Mahoney 1985)

1987 The National Policy for the Education of Girls and Schools Commission Projects of National Significance is in place to help initiatives nation-wide in relation to pressing equity needs.

The National Policy provides a plan of action and strategies for improving girls' experience of schooling (1987:37-60) (See also Byrne 1987).

1987 National Policy Point 3.5 Registration of Non-Government Schools is a recommendation of paramount importance to counter elitism in education, where "meeting the educational needs of girls is the responsibility properly shared by all schools government and non-government" (1987:37).

It is crucial that boys in all boys' schools are re-educated if the needs of girls and women are to be sensitively understood by this class of boys whose socialization may well lead them to positions of power and authority in adult life.

(Mahoney 1985; Wyld 1987; Sampson 1989:139; Browne and France 1986; Willis and Kenway 1986).

- 1986 - o Feminist philosophy very much in line with post-modernism,
1989 radical democracy in education, excellence in education and evidenced by their increasing discourse with feminist philosophy. A philosophy for gender inclusiveness is also growing out of research in classroom interaction (Sagar & Schofield 1980).
- o Feminine Morality debate - evolution or revolution? At the societal and educational level. (French 1986; Cross 1989)
 - o A strong move to reconsider the interplay between cultural differences and gender differences (Partington 1985; Kalantzis 1986; Walkling and Brannigan 1986; Kalantzis & Cope 1987; Davis 1987).
 - o Sex and social class again revisited. (Yates 1986; Eliou 1987; King 1987). Ethnicity and Gender concern (Ministry of Education 1988 WA)
 - o A growing movement towards the empowerment of children and youth, by transforming their consciousness to 'gender' and actively encouraging them to change their "definition of the situation" to build a gender inclusive curriculum. (Kartini 1920; Stanworth 1981; Johnson and Hall, 1984; Mahoney 1985; Haycock 1987; Spender L 1988; Leder 1989:85; Baker 1989:94; Martinez, Diamond, Davis 1989:58 Payget 1989:95; Brooks and Walker 1989).
 - o. Pupil empowerment (Hattie 1989).
 - o Empowering and Educating Parents, (Vasey 1989:98).
 - o Concerns for Policy, Administration and Decision Making, (Sampson 1987, 88).
 - o Curriculum broadened to include the "living curriculum" with the wider community, PTAS and predominantly male school hierarchies where the major aim is to actively combat outmoded sex stereotypical roles (Evans 1989:73).
 - o Co-educational or single sex schools (Willis and Kenway 1986)
 - o Institutional thinking and attitudes (Hansot 1988; Sampson 1989:139; Marsh et al 1989:144)
- 1983- Increased collaboration between Ministries of Education, Tertiary,
1989 TAFE, Secondary, Primary and Pre-primary latterly with collaborative male input in policy matters, advisory roles, implementation and evaluation. Primarily for professional development of teachers and assistance with their curriculum development for girls in school. (Whyte 1973; GIST 1983; Spanier et al 1984; Barnes, Plaister & Thomas 1984, Girls into Maths 1986; Lewis and Davis GAMAST 1988; The McClintock Collective 1989:133; Garnett, Tyson, Michael McGowan and Rennie 1989; Dresden Gramps 1988).

- 1987 o "Know thyself - Teacher" (Foster 1987:135), "Teachers need to be aware of their own prejudice they bring to the classroom" ... before prejudice can be altered it must first be recognised. Foster uses the term 'reflexivity' to describe the process of one being able to view his/her own ideas, values and actions objectively and critically.
- o Development of Feminist Pedagogy (Roy and Schen 1987; Rothschild 1988; Rosser 1988).
- 1988 - o Growing international debate concerning gender and Science
1989 Technology. (Harding, Hildebrand, Klainin 1988).
- o Verbal and Non verbal classroom language and interaction still a concern (Sadkar and Sadkar 1988; Clarricoates 1988).
- o Concern for improving Primary Science, career education and technology (The McClintock Collective 1989:128-138)
- o Action research and programme implementation (Fitzgibbon 1989:49; Martinez, et al 1989:58)
- o Career education - counselling reform, raising aspirational levels and expectations with regard to higher education and career opportunities (Kfir 1989:213-236; Poole and Beswick 1989; Sjöberg 1989:34; Kingsland 1989:45; Beruldsen 1989:56; Newhouse 1989:90); Creating Pathways, Role Models (Parker 1989:113; MacPherson 1989:117).
- o Stringent evaluation of all aspects of the curriculum (Tetreault 1986; Sears & Feldman 1966; Keddle 1971; Fennema 1980; Sampson 1981; Stanworth 1981; Spender 1982; Parker & Offer 1989; Newhouse 1989; OECD 1986; Rennie & Mottier 1989).
- o Concern for professional development of women teachers (McClintock Collective 1989:128)
- o Preferred learning styles and valid gender differences in problem solving (Foster 1989:32) Classroom organization and teaching strategies (Villiers 1989:61)
- o Gender inclusive teaching materials emphasised (Gilbert and Rowe 1989).
- o Inclusive knowledge and the belief that women and girls can contribute to knowledge and truth. (Mares 1989; Parker & Offer 1989:118).
- o Growing interest in education for equity in the context of communist education (Wharton 1988), and other countries, (Kfir 1988:213-236; Klainin 1989:101-112; Broadfoot & Sutherland 1987:23-1; OECD 1986; Shah 1986).
- o Concern for professional development of women teachers and their career paths (Sadkar 1988; Sampson 1987/1988; McClintock Collective 1989:128; De Lyon et al 1989)

- o Increasingly valuing women's pursuits, interests and occupations (Sher in Littleford 1989:280; Shah 1986; Home Economics Studies in CAES and Schools).
- o Bringing values and morality back into education (Reid 1989; Cross 1989:38).

1990 Looking forward to the 1990's, as Phase I of Inclusive Curriculum, we need to reflect and gain insight from satellite curricula of the past twenty-two years, including the "Curriculum for Girls", "Multicultural Education"; "Education of the Aborigines"; "Gifted Education"; "Special Education". Secada (1989) provides a new conception of equity "Educational Equity is what gauges how well our educational situation lives up to our ideals of justice in the face of changing circumstances and our evolving notions of justice". (Secada 1989:81)

"It looks as if the unbelievable wealth of possibilities which can now be unleashed means that the 'open' education system so long sought by the egalitarians stretches before us, in strange shape, over the next century. But the sober message of the past is that every yard has to be fought for". (Jackson 1970:4).

RECOMMENDATIONS - TOWARDS A GENDER INCLUSIVE TRANSFORMATIVE CURRICULUM.

It is recommended that faculty members in the School of Education, educate and actively encourage students and practising teachers to:

1. be committed towards enabling girls to fulfil their potential in terms of skills, qualifications and personality development.
2. actively encourage girls to reflect on ways women's lives have been circumscribed and ways they can actively transform their own lives.
3. overhaul a curriculum that for generations has devalued women and their concerns.
4. persuade girls that jobs in engineering, computing, technology and science are open to them.
5. consciously move from a situation of male privilege to one of greater equality - by investing more resources towards girls. (e.g. Executive Academy for Girls, Willetton Senior High School; Upper School Physics for Girls, Kent Street Senior High School).
6. establish back up facilities which pool the efforts of teachers and full-time researchers to create more exciting and accurate teaching materials and teaching/learning packages for teachers, parents and pupils.
7. monitor progress towards equity
8. create "girls only" groups at times to enable girls to share experiences and work out constructive ways of dealing with gender inequality and sexual harassment.

9. raise the aspirational levels of girls with regard to higher education and career opportunities.
10. Increasingly work towards valuing traditional female pursuits, interests, occupations and homemaking.
11. bring values back into education, and focus on moral development and concern for others in the community.
12. address "concerns for eclectic practice in curriculum change" and the need for developing fresh insight into pedagogies for a gender balanced curriculum.
13. study in depth the development of Home Economics as a "new integrative" discipline in Tertiary Institutions, evolving from traditional "feminine"/girls' curricula in schools and "domestic science" colleges - with particular emphasis on their underlying ideology and philosophy.
14. monitoring changes in attitudes of women and girls towards themselves, their perceived capabilities and achievements in all areas of human endeavour.
15. acknowledge the need for stringent evaluation of all aspects of the curriculum.
16. read reports and articles on the current "macro" progress for "inclusion of new scholarship on women".
17. vigilantly monitor for gender bias; teachers' attitudes, values, interactions, and degree of encouragement toward pupils.
18. consider the curriculum development for "gender inclusiveness" in Science, Maths and Computer Technology, as a template for other areas of curriculum development and action research.
19. investigate the curriculum development in "Craft, Design and Technology" from UK, which developed from a mainstream "masculine" orientation with an emphasis on "inclusiveness".
20. increasingly perceive teachers as "transformative" and, who can do much to assist girls to gain the confidence and competence necessary for equal participation in today's society.
21. demonstrate to boys and girls that traditionally feminine attributes "nurturing, caring, gentleness and loving", are as valid in leadership as "strong, decisive, logical", traditionally masculine attributes.
22. reflect an "androgynous" manager image as teachers and school administrators.
23. develop curricula that assist both boys and girls to engage in non-traditional activities without being expected to give up gender identity recognizing that it would be beneficial not only for the individuals concerned, but for a more humane, caring, productive society.

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A CURRICULUM FOR GIRLS

National Policy to School Policy and Programmes:

To effect an equitable education for girls, schools need to build on the "National Policy for the education of girls in Australian Schools" (1987) considering their school's situational analysis, a needs assessment of the girls and the philosophical beliefs of the administrators, teachers and parents concerning gender equity. This is an essential prerequisite for programme development to ensure all participants are in agreement and supportive of, in this case, an equitable education for girls.

Goals of the Education for Girls:

- (1) Enhancing Girls' personalities, confidence, self esteem and valued identity as a female.
- (2) Facilitating the learning of girls in relation to knowledge and skills relevant to competency in a technological age.
- (3) The pursuit of excellence in fields of endeavour of personal interest to the individual girl.

Major Modifications for an Effective Curriculum for Girls:

1. Need to develop awareness of the hidden 'gender' curriculum and the way it affects expectations, communication, beliefs, values, attitudes of boys and girls in the school and classroom.
2. Need to seek to create a climate of equity in the school and classroom, through active strategies for change by administrators, teachers, parents, support staff and pupils - both attitudes and actions.
3. The classroom and creating a climate of equity by:
 - (a) focussing on teaching materials by eliminating sex bias monitoring for gender inclusiveness;
 - (b) taking account of preferred learning styles of girls to assist in selecting appropriate physical environments, suitable teaching strategies and equitable evaluation modes
 - (c) linking teacher expectations to classroom interaction both verbal and non-verbal, to enhance girls involvement, self esteem, learning capabilities and a belief in self;
 - (d) focussing on content itself and the underlying masculine ideology, morality and philosophy;
 - (e) making Professional Development of teachers and parents a priority, always vital when "equity" is an essential principle;
 - (f) focussing on career education as it permeates the whole curriculum for girls and as a specialist unit of study;

- (g) student empowerment to own the challenge of creating gender equity in schools - to increase awareness and confidence and change teacher behaviour;
- (h) monitoring and evaluating progress in creating climates of equity, through results in girls' academic records, changes in occupational status of women, enrollment in university and TAFE courses;
- (i) disseminating evaluation to all concerned participants other educational institutions and the wider community.

4. Focus on 'masculine' disciplines particularly,
 Mathematics Education for Girls
 Science Education for Girls
 Computer Education for Girls
 Industrial Arts Education for Girls
 Physical Education for Girls
 and integrated studies, such as Home Economics, for gender inclusiveness

Feminine Philosophy as it pertains to the Curriculum for Girls:

French (1986) has written a powerful treatise on the distinction between feminine morality and masculine morality. The former encapsulates a vision of hope, the ability for people to change circumstances through collective cooperative effort. A morality that cherishes 'life' per se, and values caring for people and the world - giving human dignity to all people. In contrast, masculine morality is based on power, authority and competition at the expense of others, a morality without a vision of changing circumstances. The masculine morality is the basis of practice in our institutions, for example education, the law, the family, the economy.

It is clear, from the action research I have investigated, that where such a feminine morality and philosophy of life undergirds curriculum innovations for girls, effective changes are being made. (The McClintock Collective is an Australian example). This feminine morality is evident too in teaching strategies that consider social issues and traditional conventions as a prior consideration, before focussing on traditional facts, concepts, rules and principles of the subject discipline (for example Villiers 1989:61).

Situational Analysis:

57.1% of the year 8 cohort of females (as compared to 49.3% of males) was enrolled in Year 12 in 1987. A differential of nearly 8% in favour of girls. Overall there has been an increase in the retention of secondary school students. According to de Laeter and Malone (1989:24), 65,278 students were enrolled in Year 12 in 1970 compared to 142,407 in 1987.

This represents a 218% increase over the 17 year period. This shift in balance between males and females at Year 12 and increasing numbers now remaining to complete secondary education means that students of varying abilities and interests are pursuing subjects at upper school level. There is a need to encourage students to enter technological and scientific fields of study to enable them to perform effectively in a technological society and to contribute to Australia's ability to compete in a

technological world. There is a need to attract our most able students, particularly females, into the fields of Science and Technology. There is also a need to improve the scientific and technological literacy of students, particularly girls, to enable them to compete for occupations and apprenticeships from which they have traditionally been excluded (Towns 1985).

Equity in Education:

"An education which is fair and impartial", where "fair" refers to "legitimacy of education" which is provided or the validity to the child's needs for their eventual educational outcomes (ie. transition from school to either tertiary study or the work-force) and "impartial" without bias.

Sir William Cockcroft, a British education expert, was recently quoted as saying that he felt the WA School System was still concentrating on catering for the top 20% of students who went on to tertiary study, "Anyone who does not fit this area were merely given a watered-down version" (West Australian 1990).

Gender Inclusive Curriculum:

Teachers have to dispel the "hypothesis that those most likely to succeed are those for whom the system has most meaning the middle class male ... once this is achieved only then will gender equity become a reality - most importantly people's perceptions must change" Bransom et al (1979:68).

GENDER INCLUSIVE CURRICULUM

Philosophy:

It would seem to me from my readings of the history of girls and women in formal education that we are trying to remedy the failings in our education system without primarily considering the underlying philosophy, ideology and morality which pervades the curriculum and our education system. (Noddings 1982; Gilligan 1982; French 1986; Cross 1989:38-43).

We also seem to have lost sight of education as the 'Creation of talent'. Our preoccupation with education as the "transmission of knowledge and skills leading to competency as an adult", can over ride a desire to foster competency and excellence where the learner is at. Confidence, a sense of excitement of discovery of self and the world around us are so clearly seen in the youngest children, but so rarely shown even in our most gifted, especially girls. (Swift 1969:25; Poole 1980; Sadkar and Sadkar 1988).

Parents, Teachers and Future Employers - A Vital Partnership:

Wherever there has been concern for equity in education, educators, both have borne in mind that the education system is only one setting for the development of self concept, valued aims, achievement motivation, cognitive skills and the creation of talent.

Clearly it is a mistake to assume that the education system is the only, or even the major way in which the total of ability in society is improved. Demands made upon people in the family and at work are also vital (Swift 1969:25-26).

Curriculum innovators in the education of girls have paid particular attention to the vital role of parents in socializing their daughters and of future employers in assisting girls to pursue careers of their choice and thus expand their life chances.

The Institution of Education & Equity from a Sociological Perspective:

"... the institution of education reflects and reproduces the power structure in society in terms of allocation to positions and of the moulding of individual consciousness. Males are directed towards more rewarding skills" Foster (1987:77).

Foster (1987) building on the work of Tesconi and Hurwitz 1974; Connell 1982; Parker 1983 focussed on the structure of the Education Institution in Australia and the way it perpetuates inequity:

"Australia's education is structured in a way that inequality is inevitable. For example, capital actual wealth, as well as cultural capital - plays a part in the type of education we can afford, the level of resources to be provided, how long we stay and the outcome of the experience" (Foster L.E. (1987:98).

Foster, L.E. (1987:177) noted how this structure adversely affected the education of girls and proposed that only by paying "explicit attention to the culture of girls and women" can we "achieve a positive re-orientation of educational outcomes" for inclusiveness. (See also Thompson 1987).

A Focus on Obstacles and Identifying Deficiencies in the Australian Education System in Relation to Girls 1975-1985:

Progress towards curriculum change was very slow during this period. Small projects though valuable were not able to effect system level change. Individual teachers working alone in hostile school environments found the implementations and development of non-sexist curricula and strategies was inhibited drastically. An unlikely resistance came from humanities teachers, often female, who did not wish to "relinquish their best girls to broader fields". Although there were the policy statements of all the Australian States (1979-83) there was still a need for school level policy statements to legitimize change and to give innovators and innovations practical and moral support.

There was also a lack of procedures for disseminating information about curriculum projects nationally. This resistance to programmes designed to redress the disadvantages of girls was further exacerbated by "sexist curriculum messages reinforcing and being reinforced by outside influences namely media portrayals of women" (Steward 1983) and parent's sex stereotyping. Foster V. (1985:30) and others noted current areas of concern:

- (a) the use of different disciplinary action for boys and girls,
- (b) the conflict generally experienced by adolescent girls between academic achievements and conformity to the feminine stereotype,

- (c) the need for career information:
 - (i) broaden girls occupational and life perspectives
 - (ii) to increase girls sense of control over their own lives
 - (iii) to promote self esteem which does not depend on conformity with unrealistic media stereotypes.
- (d) the need to up-grade girls' sport in school, and
- (e) the need for improving girls' participation in subjects, which would maximize their post-secondary options, particularly, in the physical sciences and maths.
- (f) that many curricula reinforce girls' perceptions of themselves as subordinate to and less competent than boys and their values and opinions as less important than those of males.

Sex differences in participation in school subjects received the greatest emphasis in descriptive research during the period 1975-85:

1. There were investigations into subject provisions for each sex, subjects chosen by each sex and career counselling in schools, in particular by (Sinclair; Crouch and Miller 1977; Knight 1977; Russell and Smith 1979; Leder 1980-82; Sweet 1980/1982; O'Donnell and Craney 1981; Brown and Fitzpatrick 1981; Earley 1981).
2. National Reports on education and employment confirmed girls as a group were handicapped by career options closed off in the school years, thus limiting their life chances and reinforcing traditional stereotyped life-styles. (Williams 1979; Myers 1980).
3. Researchers found that stereotyped orientations to school subjects were discernible as early as the primary school years. (Schofield 1981; Jones 1981)
4. Most interestingly, even when subjects were not sex differentiated by schools, girls and boys still gravitated to traditional female and male subject areas. (Girls and Tomorrow, 1985:16)
5. Investigations into Curriculum Content showed how the selection of knowledge, skills and attitudes had affected girls since it was controlled by the dominant group:
 - (a) In Australia, the human experience transmitted to students in schools was, in fact, male experience (Connell 1982; Parker 1983).
 - (b) School curriculum was now perceived to be a vehicle for perpetuating a reality determined by men.
 - (c) Women's contributions and their social and psychological experiences were either omitted or presented as less valuable than those of men.
 - (d) The Curriculum failed to provide girls with unbiased information about the realities of post-school life. It did not recognize that for girls, as for boys, there should be the following equitable outcomes:

- (i) marketable labour force skills
 - (ii) accurate information about various options in life, and
 - (iii) high self esteem
- (e) The Curriculum perpetuated the dependency of girls and the inability to be economically independent in later life.
- (f) Sex stereotyped curricula throughout pre-school, junior primary and high school conveyed an image of females as subordinate devalued human beings which limited girls' life options. Reinforcement of sex appropriate behaviours encouraged girls to be passive, caring and quiet, and boys to be active, strong, questioning and alert. Conceptual development of girls tended to be narrowed towards passive reception of information, whereas a broader inquiring style was encouraged in boys. (Connell 1982; Parker 1983, cited in Girls and Tomorrow 1985)
- (g) Daughters of semi skilled and unskilled workers were identified as the most disadvantaged category where the class and gender "each work on, reinforce and subvert each other". (Cooper 1969; Knight 1977; Sinclair, Crouch & Miller 1977; Bransom and Miller 1979; Connell, et al 1982; Parker 1983).

Conclusion to this period was the strong feeling that:

A "gender inclusive" approach should permeate the whole curriculum with emphasis on understanding skills that are valuable to girls and boys alike; and a warning that economic and aesthetic influences that limit girls' potential in Australia whatever their futures, reduce their ability to contribute to the life of the nation.

The Committee of Girls and Tomorrow, (1985:28) had convincingly moved the focus from "deficit" in girls to the inadequacy of the Australian Education system in catering for the needs of girls, with particular regard to class, ethnicity and other individual differences.

They identified a number of foci for change in the curriculum:

1. A recognition of the difficulty of implementing curricula for girls in primary and secondary schools.

"In gender-inclusive curriculum, there is a strong need for professional development of Principals and Senior Masters/Mistresses in their leadership role as school-level decision makers. However since the emphasis is on school based curriculum development, the "new transformative teacher" should be valued. The major difficulty is that though schooling, particularly at the primary level, is largely run by women, it is still "substantially controlled by men". (Evans 1989:78).

2. A need for a Gender-inclusive vision of human endeavour, which takes accurate account of recent social changes affecting the lives of both women and men.

3. A transformation of the whole curriculum to eliminate sexist assumptions about the social and economic roles of women and to emphasise knowledge and skills which are valuable to females and males alike. The Beazley Report of Western Australia had already produced a definitive list of recommendations for the Education of Girls (Beazley Report 1984:341-349:16).
4. A life skills course for both girls and boys drawing on elements from existing sex labelled skills courses such as Home Economics (Fabric & Design, Home Management, Budgeting, and Cooking), Parenting element and caregiving emphasis, Early Childhood Studies, Business Studies, Industrial Arts (Design and everyday skills), Consumer and Legal Education (may be integrated).
5. Courses on the analysis of the concept of work. The valuing of paid and unpaid work. The dominance of men in work roles and the relative lack of promotion of women to positions of power and authority. The careful monitoring of contemporary patterns of individual and family life. The emphasis on developing marketable skills for girls and domestic skills for boys to redress the balance at the present time.
6. Human relationship courses or whole school approaches (eg Willetton Senior High School in WA where Year 11 girls and boys are actively involved in pastoral leadership each with responsibilities for a group of younger students). Facilitating moral and social development.
7. A need to engender in girls a positive approach to the physiological and emotional changes of puberty as a "welcome passage into womanhood" (Taylor 1981).
8. "Sexism is a process through which females and males not only progressively learn that different things are required and expected of them because of their sex, but learn those things in an unexamined way. Good education is incompatible with such a process ... positive action to counter assumptions based on past realities is necessary to transform the present formal equality of the sexes into a real reality of options. It is not a questions about fastening broader responsibilities on the school. It is a question about whether or not it is an educational institution". Carter & Bednall (1986).

Schools should provide all young people with the skills and confidence they need to plan their lives around the realities of contemporary life, including paid work, unpaid work and leisure.

However, Girls' potential is being limited by deeply entrenched sex stereotyping. On the other hand the male stereotype encourages boys to explore a wide range of options and to aspire to high achievement. Social forces limit girls' options, their aspirations, their curiosity, their speech and their space. Schools should help girls to break these limits.

The Need to develop Girls' personalities in a bid for Gender Equity and enhancing girls potential to achieve academically and in future adult roles:

Personality is the:

"dynamic organization within the individual of the psychological systems that determine his/her characteristics thought and behaviour". (Adapted for gender inclusiveness from Allport 1963 cited in Entwistle and Ramsden 1983).

Personality has been variously defined to include intelligence (Eysenck) and physical characteristics (Sheldon) but it is also the "sum total of our motives, aspirations, feelings, interests, attitudes, beliefs, expectations and values which determine our characteristic, consistent thought and behaviour".

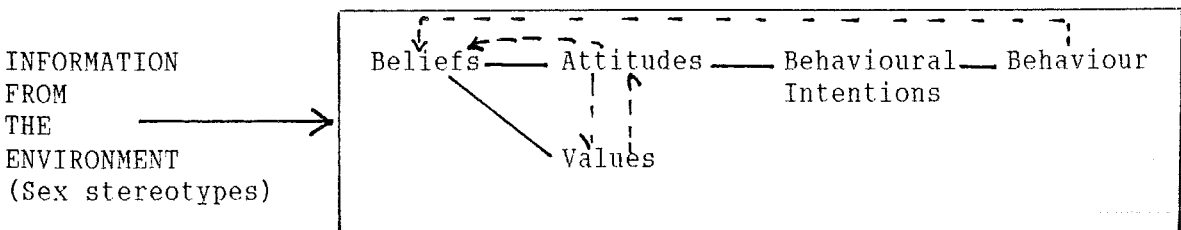
Cirese (1979:252) believes that "The quest for personhood is the search for liberation from sex roles and stereotypes. It is the search for a concept of humanity that is broader than male:masculine or female:feminine". Gender Equity then is about valuing another person regardless of sex, encouraging not denigrating their interests and directing them to open up their options in a technological world. Interacting with the same quality as boys, yet not encouraging "learned helplessness".

G.H. Mead wrote of a concept of self and self worth as a "reflection in the eyes of others". Women have had to struggle to have their intellect and their creativity recognized and girls in schools, even today, are damaged in the full development of their personalities, in terms of limiting their aspirations and expectations of themselves, devaluing their present and future roles in society and perpetuating a low valuing of self because they are female. Presently educators are perceiving a corollary for boys in their personality development (Mahoney 1985).

We bring sex stereotypes into the classroom and into every interaction, thus we need to counter invidious unhelpful stereotypes, especially those debilitating girls.

Connections Between Beliefs, Attitudes and Values and consequent behaviour:

WITHIN THE PERSON



Adapted from Fishbein & Ajzen (1975:16)
cited in Gardner et al, Social Psychology 1981:275

Barry and King (1988:226) state that "we know that the affective state of pupils influences the effectiveness of learning", this is infinitely true of girls and their lowered self esteem.

"Self esteem refers to the sense of self respect, confidence identity and purpose found in an individual".

Involvement of Parents, Teachers and 'significant others' and peers in enhancing girl's self esteem:

Maskin and Flescher in Gurney (1987:135) "as noted in other areas of educational endeavour involving the parent appears to be crucial in developing and maintaining their children's self esteem".

It is the teacher, parents and significant others who will promote in girls "an attitude of approval or disapproval" and indicate "the extent to which she will believe herself to be capable, significant, successful and worthy". (adapted from Coopersmith cited in Gurney 1987). Self esteem then is a "built-in intrinsic motivator" that "distinguishes the highly productive individual from the low achiever" (Lawrence 1985). Bower and Bower (1985) do, however, believe that people can improve their own self-esteem and can begin to "synthesize a history of successes". There is an urgent need to foster self esteem in girls.

There has been a wealth of Australian research in the area of self-esteem (Edgar 1974; Pool & Simkin 1976; Knight 1977; Dynan M.B. et.al. 1978; Smith 1978; Burns 1979; Taylor 1981, 1982; Smith & Marsh 1982;). They identified sex differences in self-esteem and self concept where adolescent boys' self concepts are more positive than girls; and girls' self esteem is significantly lower than boys.

Connell et al (1975) found sex esteem progressively increased through adolescence. Burns (1979) found this true of late primary grades, where boys' self concepts became increasingly more positive and girls' more negative. Gurney 1982 found that when girls left school and found work their self esteem rose considerably, indicating how debilitating school is on some girls (cited in Girls and Tomorrow 1988).

Underachievement Due to Lowered Self Esteem of Girls:

"Drop in the level of achievement ... were all girls ... where they had often received comments that stated girls are not meant to be too smart". Friedan (1963).

Beswick 1975; Dynan M.B. et.al. 1978 found girls consistently underestimated their own academic abilities, lower than boys and their measured abilities. Many researchers observed girls' lack of, or reduced, sense of competence in relation to school tasks, despite evidence to the contrary. (Bielski 1981).

Research by Dynan (1983) in Western Australian schools investigated self concept, alienation and teacher relations which opened the way to classroom interaction research.

Clifton et al (1986:58) showed that differences between boys' and girls' performance are due to differences in teachers' expectations of the students, not to differences in students' abilities.

Aspirations of 17-18 Year Old Girls:

Almost as a cumulative effect of adolescent years of marginalization in the classroom, girls' aspirations appear to "slow down their achievement rates".

The most disturbing finding in an Israeli study of adolescent boys and girls from the two ethnic groups of Euro-American and Afro Asian origin, was that 17-18 year old Afro Asian girls especially "slow down" their own rate of progress and achievement behaviour, giving boys significant advantage in achievement and future career aspirations. Boys have an advantage in occupational aspirations at all ages and in educational aspirations for the future.

This is exacerbated by teaching in the Israeli high school which limits girls to an academic track, but allows boys a wider opportunity in technological tracks. Boys in general are more instrumental, Afro Asians do not choose mobility tracks that entail long term investment, but Euro-American have long term aspirations and have the ability to make long term investments. This research has significance for Australian Aboriginals, both boys and girls, minority groups and girls. (Kfir 1988).

Modifying the Curriculum for Girls:

Curriculum change ... "needs to be undertaken in a highly professional way in order to ensure the scholarly quality and non-manipulative character of the output" It requires "enthusiasm, the necessary scholarship and open-mindedness". Girls, School and Society (1975:93).

The Teacher as the Major Curriculum Developer in Girls' Education:

Curriculum development "is a deliberate, purposeful planning activity that seeks to achieve general and specific intentions" (Print 1989:10).

Sir Cyril Burt (1965:684) stressed the "need for research by teachers who can combine first-hand practical experience with a knowledge of scientific methods".

Teachers need to be aware of their own prejudice they bring into the classroom. Foster (1987:135) points out that before prejudice can be altered it must first be recognized and uses the term "reflexivity" to describe the process of one being able to view his/her own ideas, values and actions objectively and critically. Equity education is a "process of encouraging educators to create teaching-learning environments in which the hidden, latent and intellectual potential of every student is released and developed" (Rodriguez 1986:14).

Conceptions of Sexism and the Concerns of Educators

Conceptions of what constitutes sexism vary, where political values and technical understandings about schooling processes play a part. Some educators concerned with counter-sexist work focus on sexist teaching (or consciousness formation), whilst others are concerned with equal opportunity or selection and allocation. Most recently in curriculum there is a growing recognition of deeper issues (Davies 1989:1-21).

Teaching Process Concern:

Teacher behaviours in the teaching process are a concern. There is a need for teachers to attend to democratic negotiated relationships, to language and interaction, discriminations and ways to remedy these and to counter harassment (Davies 1989:1-21).

The three sub divisions of teacher behaviours that have been the focus of this research report on the curriculum for girls are related to:

1. Bias free instructional materials
2. Classroom organization and arrangement related to preferred learning styles of girls
3. Verbal and non-verbal classroom language and interaction.

Equal Opportunity - or selection and allocation - Concern:

Within this conception of sexism there are legal and other checks on provisions for boys and girls, with attempts to reform school careers counselling. The influence of technological change and unemployment is of increasing concern for girls' futures. There is inherent in the curriculum for girls a strong component of "Career Education" and quantitative evaluation related to statistical analysis of girls in TAFE courses, tertiary courses and occupational percentages.

Curriculum Concern for Deep Issues:

Work on women studies, health and human relationships, mathematics, science, computing and gender inclusive curriculum. Men and Women are showing even deeper concern for the very nature of knowledge and its inherent methodology.

"we can no longer pretend that what we teach and the way we teach does not carry ideological messages" (Cross 1989:42).

RECOMMENDATIONS:

Introduction to Curriculum for Girls:

It is recommended that Educators and teachers

- o regard themselves as curriculum developers and action researchers in the area of girls' education.
- o be knowledgeable about the major goals and modifications for an effective curriculum for girls.
- o consider feminine philosophy as it pertains to the curriculum for girls.
- o analyse the current situation in schools in Australia.
- o translate the theoretical concept of equity into a workable practice in curriculum in schools.
- o change their attitudes which at present limit curricula to the needs of the middle class male student in Australia.

- o recognise the need to reconsider the philosophical underpinings of the institution of Education in Australia.
- o consider education as the 'creation of talent'
- o regard parents, employers and tertiary colleagues as vital partners in the challenge of effecting gender equity.
- o focus on the obstacles and deficiencies in the Australian Education system with regard to the curriculum for girls (1975-89)
- o reconsider the importance of making a fresh study of personality development to ensure that in practice they facilitate girls' and boys' personality development.
- o are especially conscious of the way they can develop realistic expectations in girls, raise girls' aspirational levels, positive values, especially of self, and expand their horizons and cultivate interests of girls without injuring their feelings.
- o consider that enhancing girls' self esteem is vital for balanced personality development and achievement of their potential
- o develop strategies to assist in raising girls' self esteem, expectations and aspirations to counter underachievement in the adolescent years. . .
- o recognize that their prejudices must be identified and altered through critical and objective observation of their own behaviour in the school and classroom.
- o acknowledge that counter-sexist strategies are focussed on concerns about sexist teaching, concerns about Equal Opportunity and concern for deeper issues.
- o pay particular attention to modifications in 'Masculine' disciplines such as Mathematics, Science, Computer Studies, Industrial Arts and Physical Education for Gender inclusiveness.
- o learn more about the culture of women and girls through a study of an integrated discipline such as "Home Economics".

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THE EDUCATION OF GIRLS - FOCUS ON THE HIDDEN CURRICULUM

It is important to note that within the school system there is an existing "code of ethics" that is unassessed called the "hidden curriculum".

"The hidden curriculum teaches principally about beliefs about society and about the role of different groups or individuals in it ...it is regularly transmitted to pupils ... it is the naturalness and convictions with which certain attitudes are held - and thus transmitted - that make the hidden curriculum so strong" (Sutherland 1981:128).

The hidden curriculum has many aspects, but the major concern in relation to the education of girls is learning about sex roles and sex differentiation in society.

The hidden curriculum ... speaks of expected differences in what males and females are good at, and good for. (Burke 1982:25). Sutherland (1981:128) recognized that this learning was influenced through:

"teaching materials, textbooks, illustrations, literature and history in particular, the media, the structure of the school staff and relationships within the school".

We now recognize how the invidious nature of sex role stereotyping pervades the very essence of all the content taught in the school; our personalities; how teachers teach and interact with their pupils; how as teachers, boys and girls, we process information and build up perceptions of each other and ourselves. (Mead, G.H. 1934).

I propose to look at the way educators and researchers have brought to light the gender issues in many different ways, attempting to identify and counter the invidious effects of sex stereotyping without detracting from the value of acknowledging the masculine and the feminine within each individual for achieving full creative potential.

"The Elimination of sex bias in education gives the most promising prospect for the cultivation of individual talents and the expression and recognition of differences between people".
(Sutherland 1981:223).

A CURRICULUM FOR GIRLS - THE EFFECT OF LANGUAGE AND LANGUAGE PRACTICES IN GENERATING GENDER BIAS

INTRODUCTION:

"Ensuring that language used in schools is non-sexist, non-racist and culturally sensitive is a fundamental building block in creating an educational environment that is supportive and inclusive of all students". (A Fair Say, Ministry of Education 1987)

The role of language practices in constructing gender bias has been the focus of research over the past twenty-two years in Australia and overseas (1968-1990).

Society provides through its structures, its language and its interactive forms - possible ways of being, of thinking, of seeing and in many, through probably not all, of them, gender is made relevant ... "our way of being at any one point in time will depend on subject positioning made possible by the discursive practices in which we participate". (Davies 1983 cited in Davies 1989:5).

The most recent and sharpest attack on language conventions, with its subtle and hidden bias has been with respect to Gender. Cazden in 1975 wrote "Language poses multiple problems for education because it is both curriculum content and learning environment, both the object of knowledge and a medium through which other knowledge is acquired". Black and Coward (1981) focussed on the effects of language on our aspirations and expectations.

"language has a material existence. It defines our possibilities and limitations, it constitutes our subjectivities". (Black and Coward 1981 cited in Lees 1986:159).

Sutherland (1981:134) observed "English language - like many other European languages - do tend to put females in a position of inferiority or invisibility".

The Silence of Women - The Nature of the English Language:

The works of Sapir and Whorf (1966) have demonstrated how culture and language are intimately related.

"Human beings do not live in the objective world alone as ordinarily understood but are very much at the mercy of the particular language which has become the medium of expression for their society". (Sapir 1966).

Linguists and researchers during the late 1960's and the 1970's began to look closely at the masculine nature of the English language and the implications for girls and women. (Leach 1968; Schulz 1975; Miller and Swift 1976; Lakof 1975; Stanley 1975; Robins 1978). Spender (1980), researching from a feminist perspective, extended on their work. For example, she looked incisively at the progressive denigration of nouns that related to women and the eulogy of corresponding nouns that have enhanced the image and status of men.

However of most concern to Spender was the resulting silence of women:

"It is the silence of women, in language and in the use of language that has emerged when women are considered in the patriarchal order" ... "when the only language women have debases us and when we are also required to support male talk, it is not unlikely that we shall be relatively silent". (Spender 1980:51)

She believes that as we consider "women's silence", we can "begin to transform our language to be more inclusive and to begin to value and revive feminine concepts and virtues once more".

There is however a hopeful note that any language can be expanded or modified to accommodate changing social, technical and philosophical ideas. (Fishman 1960; Hymes 1964; Halliday 1969) and this has very much been put into practice in creating learning environments for girls. A further general point is that language can also generate change since, "language and culture are intimately related" (Sapir 1966) for "it is itself a tool of critical reflection and the medium of communication about change". Thorne and Henley (1975:29) make a strong claim for speech as a form of action, not simply underlying social processes.

For example:

There has been an important change in terminology since the Commonwealth Schools Commission in its 1987 report where instead of "sex-stereotyped" they refer to "Gender stereotyped areas of the curriculum ... calling for an examination of values and attitudes relating to gender, sexuality and school achievement" (p71). This deliberate shift to the term "gender" signals an acceptance of the cultural construction of the differences between girls and boys, women and men and of the ways in which social practices contribute to its construction. Language use is one of the most important cultural practices that contributes to the construction of "female" and "male" identities. (Connell 1987 cited in Gilbert and Rowe 1989:3).

The use of terms like "gendered" draw attention to "this arbitrary and constructed societal division and makes it possible to consider the two sets of gendered identities so constructed and to question any educational implications that may result". (Gilbert & Rowe 1989:3).

A dictionary of gender-free usage produced by Maggio (1987) will, I believe, be increasingly useful to teachers, writers and authors of all materials used in schools.

Bias in Teaching Materials - countering gender stereotypes to create a climate of equity.

"Language is a very powerful means of communication in our society. From political manifestos to bill-board advertisements, from school textbooks to poetry, it demonstrates its power to inform, persuade, instruct and entertain". (Girls into Mathematics 1986:79).

We place great value on literacy and imagery to express our thoughts and receive the ideas of others. Purves and Beach (1972), and Zimet (1976) found that the way in which people receive ideas, whether visual, spoken or written depends on previous experiences.

"The attitudes the reader brings to the printed page affect the strategies he or she uses in processing the message". Zimet (1976) (See also Davies 1989).

Craney (1975) analysed the literature used in an established co-educational, middle class metropolitan school in Australia. Her focus was on lower school pupils and their exposure to Australian literature in prose. She concluded that their book selection did nothing to "widen horizons to the universality and diversity of human experience, it all too often narrows it down to a directive that the best way to achieve adulthood is to conform to a limiting sex role".

"For boys it provides the cult of physical and mental competition and violence; complete with peculiar initiation rites. For girls it promotes the idea of identity achieved only through male recognition and service. Popular sporting magazines and 'Dolly' magazines carry the same messages, much more directly and explicitly and dressed up in a more appealing way".

Sprung (1978) in her commitment to non-sexist early childhood education worked arduously throughout America with the Women's Action Alliance (established 1971) to work out practical ways with parents, teachers, administrators, teacher educators, researchers, government officials, publishers and early childhood material manufacturers to remove the "limitations of sex role stereotyping from the lives of young children" and "to raise boys and girls who can enjoy friendship and respect for one another. Together we "can create an educational environment that will prepare our children and maybe even us for the reality of our time". (Abram cited in Sprung 1978:20).

George (in Sprung 1978:154-168) in a bid for unbiased portrayal of men and women, boys and girls in publications or media material produced Guide-lines for the development and evaluation of unbiased educational materials, which could be adapted for use in evaluating audio-visual material as well. The Guide-lines, prepared from the many evaluation forms and publishers' check-lists of the 1970s, dealt generally with most of the issues related to eliminating sexism. Her Guide-lines are a classic and still, I believe, of great value today.

Quality materials, George (1978) believed, should:

- (a) reflect an accurate and broad view of the world by presenting the various groups of people who make up the world. The portrayal of the world as the sole creation of white males must be corrected and enlarged by using information from other people's experiences and perspectives.

- (b) provides children with role models of competent humans who have a sense of self worth and dignity. Social deviance and failure should be dealt with sensitively to help children understand the full impact of such behaviours.
- (c) help children understand their full capabilities and supply examples of problems that require work and time to solve and situations where adversaries coexist without destroying one another. Materials should help male children to learn that they don't always have the answers or have to be in command, but can feel comfortable in calling on others particularly females, to share responsibilities and solve problems.
- (d) all materials should be produced by creators (writers and artists) who are sensitively accurate in depicting physical images, life styles, cultural beliefs and surroundings when portraying girls and boys from different social class, racial and ethnic backgrounds.
- (e) show girls and boys in cooperative action in both mixed and sex segregated groupings. Excessive competition and conflict depicted in materials does not promote a non-sexist attitude, but rather creates derisiveness and division between the sexes. Materials creating images of companionship and true friendship between the sexes and within the same sex are vital in countering sex role stereotyping.

Production of Quality Materials & Evaluation of Existing Material:

In producing quality materials and evaluating existing materials, we need as educators to be aware of visual stimuli (illustrations) and print or audio stimuli (content and language). Illustrations create powerful images and reflect the cultural values of the characters. Content too conveys important messages about how females and males are viewed and valued in their culture.

Language of a piece of work conveys meaning beyond the definition of individual words. Many words in the English language "causes the reader/listener to picture men, even when a more inclusive message is meant". (George cited in Sprung 1978:157, 160, 163).

Content analysis of school readers and texts in Australia (Bradley and Mortimer 1973; Healy and Ryan 1975; Wignell 1976; Australian College of Education, Tasmania 1977; Gwynne, Hutchinson and Justins 1977) lent more support to earlier findings that males dominate the printed word.

GENDER INCLUSIVE ENGLISH EDUCATION - Analysis of Pre-school & Primary school books - limiting girls' expectations of adult roles and their personality development:

Research in Britain and America also found differentiation of the sexes in books.

"Books present males and females as having different occupations and personalities". (Sutherland 1981:129) and showed how Pre-school books give a misleading picture of the real-life situation by reinforcing conventional images of adult roles.

Weitzman et al (1976) found a clear distinction in the portrayal of activities of boys and girls. Boys' roles were more exciting, full of adventure and independence, girls in contrast were portrayed as passive and immobile, restricted in clothing and more often indoors. Lobban (1978) analysed six reading schemes popular in British schools, by focussing on adult and children's activities, toys and pets. Girls had a limited number of toys; boys took the lead when engaged in the same activity, but girls were allocated to looking after younger children. Adult roles presented three possibilities for girls: mother, aunt, grandmother; boys had equivalent roles plus ten adult roles; common to both sexes was the teacher and the shop assistant.

McDonald and Thompson (1975) analysed 36 books used as texts in Scottish primary schools and found even more glaring contrasts; passive behaviour: 151 situations for girls compared to 98 for boys; boys more often outside the home, boys initiated activities, had a greater variety of toys (only 40% of activities were common to both sexes). In adult activities, men were shown in 50 activities, seven only were shared by women, women stayed at home occupied with domestic duties.

Cooper, P. (1987) in a review of literature showed how sex role stereotyping exists in curriculum materials at all educational levels, with texts books more likely to portray girls in passive roles and boys in active roles. More stories are about boys or are illustrated with boys' pictures than with girls' pictures. Little space is given to the achievements of women, and sexist language is common. In addition to curriculum materials, students are exposed to sex role stereotyped materials and advice in guidance counselling offices. Davies (1989) has produced a well balanced book relating to Pre-school children and the dualist gender order they experience. She provides "the possibility of programmes of change that may genuinely work" (Davies 1989:xi).

Literature & Sex Role Differentiation

"The classics as well as modern fiction present the society of their time with society's prejudices and myths about sex roles and the characteristics of males and females ...". (Sutherland 1981:131-133).

Building on this theme, Gilbert and Rowe (1989) are encouraging teachers to analyse: "printed materials for classroom use, literature endorsed and encouraged for school and family use and text books to find out how "gender differences" were constructed. Their check-list of analytical questions are as follows:

How were differences between both sexes drawn?
 Were both sexes fairly and evenly represented?
 What role models were represented to children or adults?
 Were activities and experiences presented differently for each sex?
 What is the influence of reading matter on children's writing - are written genre forms gendered?
 What impact have "supposedly different needs and abilities of boys and girls" had upon classroom interaction, teacher expectations of students, and students' expectations of school and work beyond school? (Gilbert and Rowe 1989).

Promoting the visibility of Women writers past and present:

Dale and Lyn Spender's work in retrieving the lost women's literature of the past in both Australia and Britain has contributed to breaking women's silence, (eg. Spender L. 1988). Recently, women have been writing and publically talking about their own and other women's experiences in Australia. (see The Penguin Australian Women's Library Series).

"Different women have different stories to tell yet theirs are themes, threads and feelings that recur and experiences in common". (McConnochie, Hollinsworth and Pettman 1988:215).

The teacher of English in the final analysis, is the one who will choose to include the Women's experiences and women authors, poets and dramatists in balance with the male perspective. In the USA, Bergdahl's (1983) research into the teaching of the English Language Arts focussed research on "gender and writing"; "research based English teacher skills for classroom interaction"; "the divided self in the classics" and "popular literature as a topic for composition classes".

In Australia, Gordon (1987) emphasised the importance of the "Conference Writing Process" in the classroom, with its emphasis on the participatory, consultative interaction of teachers and pupils to encourage talking, reading and writing. She describes this process as inclusive of gender, social class and ethnicity and has researched the process in one high school. Most recently, Gilbert and Rowe (1989) have produced a comprehensive book on Gender, Literacy and the Classroom, which include many of the general issues on Gender and the particular role of the English teacher in countering gender bias.

The results of a survey conducted by Luke, et al (1986) clearly indicated the unconscious sexist and racial bias in student teachers' common sense knowledge about "what's appropriate for kids to read". (cited in Gilbert and Rowe 1989:18).

"That a predominantly female group of student teachers would select male authored and male-centred children's literature further underlies the depth of the problem facing teacher educators concerned about redressing the formal and hidden curriculum of gender socialization in schools" (Luke et al 1986:216)

Gender & Poetry:

Brooks and Walker (1989) pursue the thesis that the "rules of poetry writing - are not pure and absolute but are ideologically inflected and serve the interest of a cultural hegemony". Women poets, established and aspiring, contributed essays and statements on poetics which included "everything from the first idea in a poet's mind to the manner in which the reader interprets the published product". Their book has thrown interesting light on the difficulties experienced by women in this creative endeavour in the English language. For any teacher of English it is an important reference book with regard to the handicapping nature of English for women's expression.

Foreign Language Learning & Second Language Instruction:

Sutherland (1981:130) found French audio visual courses reinforce conventional ideas of sex roles; interestingly in sharp contrast in a Soviet English teaching textbook she quoted: "She wants to be a doctor like her father: he wants to be an engineer like his mother" Spencer & Lewis (1986) looked closely at sex equity in Bilingual Education, English as a second language and Foreign language instruction and showed how all three instructional paradigms possess and transmit cultural content.

A further study by Makri-Tsilipakou (1987) also discussed the manifestation of sexism in language and makes practical suggestions for overcoming problems in second language instruction. She focussed on exclusion of gender, sex stereotyping, sex differences in language uses, politeness, verbosity and classroom interaction.

New Initiatives in Australia 1989, with regard to elimination of bias in new books:

The Curriculum Corporation of Australia, funded by the Federal Government, is to commission new books meeting Equity guide-lines.

Present Efforts in Literature:

The late 1970's and 80's has been a time of prolific research into the contribution of women in all areas of endeavour over the past two centuries. These books should be readily available for students/teachers and educators and housed in their libraries.

Reading as Therapy - to facilitate personality development:

Spender has researched "lost" women authors both here in Australia and in Britain. Books that emphasise the positive contributions of women will hopefully influence the total development of the individual as he/she interacts with the literature. Ideas inherent in selected readings can have a therapeutic effect on personality development of both boys and girls.

SOCIAL STUDIES EDUCATION FOR GENDER INCLUSIVENESS

Social Studies Teaching:

Simms (1980) in America, examined responses of social sciences to racism and sexism in the 1960's and 1970's. He focussed on "Cultural Pluralism and its relationship to racism and sexism" and:

- (a) the text book and curricular response in schools
- (b) legislation
- (c) the critical unmet needs of blacks and other minorities.

He came to the following conclusions:

- (1) "Responses of the social studies to racism are still tentative,
- (2) "Social studies education has responded to sexism with many laudable efforts, some of the initial positive steps have eroded, such as women's studies.

and proffered the following advise:

- (1) "Suggest that institutional racism and sexism are the root causes of social issues and that teacher education, curriculum offerings and educational practices and policies must be revised to reflect reality", and
- (2) "Categorize current material for combating racist and sexist attitudes according to Alternatives in Print : A Catalogue of Social Change Publications, Student materials and teacher resources state education departments and projects and recommended readings."

The Teaching of History and Bias by Omission in Teaching Materials:

"History has been taught very much as political and military history until comparatively recently ... inevitably men have been most emphasised in history teaching ... women, save perhaps for Elizateth I, tend to have a "bad press" ... more recent emphasis on social and economic factors "do something to bring home that women were present and even influential, during past centuries". Sutherland (1981:133-134).

... Okin (1989) comments that, despite some progress, these views of women and the family have stubbornly persisted throughout subsequent Western history and scholarship, thus continually reducing women to objects who are denied authentic personhood". (Okin cited in Littleford 1989:274).

What can be done?

- (1) The development of specific studies of women's place in history does provide alternative teaching materials which can be used to avoid distortions which the traditional history curriculum is likely to produce. It also provides girls with more heroic figures to identify with.

- (2) The study of history should not be limited to the social, political and economic endeavours of women in social studies (Cancellier and Crews 1986), but be evident in Mathematics (Burton 1986); Science (Burfitt 1988:31-37); Home Economics (Thompson 1987:5-12) and all other areas of human endeavour (Cross 1989; Mares 1989).

"Great women, their achievements and contributions in history should be cited in classrooms learning alongside those of males" (Foster L.E. 1987)..

(3) The Need for Progressive Evaluation of Textbooks

Tetreault (1986) in a research paper included an evaluation of 12 recent texts and illustrated how a 5 phase theory based on new scholarship in women's history can be used to evaluate curricular change in school texts.

HOME ECONOMICS EDUCATION AND GENDER INCLUSIVENESS

Dobry (1986) has produced notes on creating bias free instructional materials in Home Economics, which is so important now that boys are also involved in this field in schools and to a very limited extent in colleges of advanced education.

Foster (1987) alludes to promoting needlework and early childhood studies as essential content for boys in order to promote gender equity.

HEIGHTENED BIAS IN TEACHING MATERIALS IN THE MASCULINE DOMAINS OF KNOWLEDGE

We are not only concerned about gender bias in teaching materials in the field of literature, social studies, foreign language learning and home economics, but with such bias in the masculine fields of knowledge, and skills. I plan to focus on four areas Mathematics, Pure Sciences, Computer Studies and Industrial Arts, whilst acknowledging that similar bias occurs in Physical Education.

Parker (1989:119) considers complacency towards bias in teaching materials helps perpetuate these subjects' recognition as "Male domains of study or pursuit". Further the exclusion of females, the feminine perspective and their unique contributions to Mathematics, Science and Technology inhibits progress towards "universal scientific/technological literacy".

Mathematics Education for Girls - Bias in Teaching Materials

"Authors of textbooks and other materials (including video, radio, computer software, wall displays, posters, worksheets, examination questions have considerable responsibility for the way messages they are trying to convey are presented and also the effects and influence on pupils" Girls into Mathematics (1986:80).

Please refer to the section on 'Mathematics Education for Girls' with regard to research, the role of the teacher and their need of professional development in deliberately countering sex bias and lack of gender inclusiveness in teaching materials in Mathematics. (Newhouse 1990:Part 3)

Science Education for Girls - bias in teaching materials

Rennie and Mottier (1989:18) believe that "the greatest concern in 1989 is not simply the matter of unequal representation of the sexes, but concern that science and technology are presented not as a human activity, but as a male activity and thus create a barrier to the participation of females".

"Further sex stereotyped roles depicted by the persons illustrated not only limit females to a narrow range of roles, but they also limit the range of activities thought to be appropriate for men" ... and according to Taylor (1987:278):

"Not showing girls as active inquiring individuals can only work against the desire of science teachers for more participation and interest by girls in their subject".

A further analysis of the dilemma of sex bias and the non-visibility of women scientists in the literature and textbooks is presented in the Section 'Science Education for Girls', together with criteria for evaluation of written communication for gender equity. (Newhouse 1990:Part 3)

Computer Education for Girls - Bias in Teaching Materials

"Timetabling, language used, software purchased, classroom dynamics must all take into account counter sexist strategies to enable equal access to learning in computer education" (Towns 1985:16).

Please refer to the section on "Computer Education for Girls" for a full exposition on language and context hindrances to effective learning by girls in this subject area. (Newhouse 1990:Part 3)

Industrial Arts for Girls

Gender Bias in images, content, examinations and syllabuses is evident. Articles by Catton (1982); Harding (1982); Rogers (1988) and Morgan (1988) confirm this bias from their UK experiences with Craft, Design and Technology Curricula. Their findings are further expanded in the section on the "Industrial Arts Curriculum for Girls". (Newhouse 1990:Part 3)

CURRICULUM CONTENT - KNOWLEDGE AND CONTROL

"Curriculum content must address the academic problem areas that have historically plagued female students" A comment by Sadkar and Sadkar (1988) during a treatise on educational reform and the lack of visibility of women. They argued that the recent wave of school reform literature has neglected females, thereby threatening to close already narrowing windows of opportunity for their advanced education beyond high school. A line-by-line content analysis of 138 articles on educational reform published in nine influential professional journals between 1983 and January 1987, showed that the educational reform movement largely ignores issues of gender equity, and that males far out number females in authorship and in depiction in photos and illustrations".

This affirms Spender's statement in 1981 that:

"Most of the knowledge produced in our society has been produced by men ... they have, in Mary Daly's terms presented false knowledge by insisting that their partial view be accepted as the whole"

Spender (1981) discussed the extent to which feminism had begun to alter the power configurations in the construction of knowledge and in society.

It is salutary to read in 1989 that Mares (1989) in her annotated bibliography highlights the crisis point we have reached in all areas of prestigious knowledge, because of the continued domination of masculine thinking in its formulation and implementation.

Salner (1985) has argued that at tertiary level "gender bias exists at the philosophical foundations of knowledge and inquiry, challenging the ideology, dominant in graduate schools, that "empirical science is the only acceptable stance toward the generation of knowledge". Nespor (1987) believes the school curriculum limits and channels the capacity of students to act in the world. In her case study, she found this was especially true of reading skills where skills formulated in the classroom are unrelated to students' outside experiences and interests. This is affirmed by Cooper (1987) that "girls are marginalized from education by its content".

A Model for the Future: Home Economics

Thompson (1987) has written a definitive paper on Home Economics and its holistic integrative nature in which "the perspectives of women and men are drawn together to provide a rounded, three dimensional, synergistic view of human experience in all its complexity" ... hopefully to provide "the best, the brightest and the most fully humanized knowledge" for human service. (Thompson 1987:11)

Concluding Comments on:

- (a) (i) The Role of the Teacher in countering bias in teaching materials and the construction of knowledge:

The degree to which teachers will be successful in creating an educational environment free from sex role stereotyping will be determined by their willingness to analyse it and effect changes where these are considered necessary". (Ministry of Education, Ontario).

Ultimately the onus is upon the teacher to volitionally consider the impact of gender in creating bias in the written word, the selection of books for study and their own thought and behaviour, only then can that consciously act on this new awareness for the benefit of both boys and girls in the classroom of the 1990's.

- (ii) Pre-service Education for Teachers:

Parker, B. (1984) produced a curriculum guide to help undergraduates to learn to research, prepare and present non-sexist curriculum units in classrooms. The course was designed to:

- (1) compensate for the lack of information in the traditional curriculum about women in culture and society;
 - (2) correct any sexism and misinformation generated by traditional disciplines, and,
 - (3) equip in the field of women's studies.
- (iii) A Handbook on achieving equity for the practising teacher

Klein (1985) has also produced a comprehensive handbook on achieving sex equity through education, of which sex equity and sex bias in instructional materials is addressed by Schau and Scott (1984). The results of them synthesizing 40 studies regarding the effects of gender characteristics of instructional materials on students, indicate that sex-equitable materials can improve both male and female students' learning experiences and assist in developing gender balanced associations and more flexible sex role attitudes.

(b) Student empowerment: evaluation in the future

O'Barr (1988) has produced selected questions to help students evaluate how their course deals with women. It is intended to heighten awareness of women in the curriculum questions, cover evaluation of course readings, the syllabus, the class and over all evaluation of courses. Five essay questions are also included to provide a frame of reference for further thinking since assumptions about gender may be explicit or implicit in many texts and topics assigned in the classroom. Historical accounts of New Scholarship on Women are also included.

RECOMMENDATIONS WITH REGARD TO ELIMINATING SEX BIAS AND FOSTERING GENDER INCLUSIVENESS IN WRITTEN COMMUNICATION:

It is recommended that:

Teachers and educators actively counter stereotypical portraiture of girls and women in the literature of their disciplines, to avoid the deleterious effect on girls' present aspirations and their expectations of academic achievement; and future adult roles of women.

Teachers and educators consciously include the achievements of women in the curriculum literature, with particular focus on literature, history, science, mathematics and other masculine disciplines.

Teachers and educators read the current contributions of women to the knowledge of all discipline areas.

All school textbooks, including literature, history, science, mathematics and children's books be scrutinized for sex bias, lack of gender inclusiveness and marginalization of women and girls.

Teachers and educators utilize appropriate Check-lists to judge the "gender inclusiveness" quality of all written communication.

Realistic adult roles for women be included in the content of all subject disciplines from pre-school to tertiary level, to assist girls to expand their life chances and facilitate wise career decisions making for the technological age.

Teachers and educators be aware that the Curriculum Corporation of Australia, funded by the Federal Government is to commission new books meeting Guide-lines, as part of the Girls in Schools programme.

Teachers and educators look carefully at the whole area of the construction and content of knowledge in their particular field and its implications for girls studying the subject.

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THE CURRICULUM FOR GIRLS - CLASSROOM INTERACTION AND GENDER EQUITY:

Foundations of the Research in Classrooms:

The research related to classroom interaction and the education of girls is firmly based in the Symbolic Interactionist tradition. There are two key lines of research namely "classroom interaction analysis" and "teacher expectations related to self-fulfilling prophesy of students".

In this section, there is a brief overview of Symbolic Interactionism, The Classroom Interaction Analysis Tradition, and Teacher Expectations and Self Fulfilling Prophecy.

Symbolic Interactionism:

Symbolic interactionism is an approach within sociology which complements and underlies research in classroom interaction and teacher expectation effects. This perspective stems from G.H. Mead's definitive lecture, "Mind, Self and Society" in 1934. It is a theory of the self or the person where self is "the product of symbolic interaction with others" ... "we perceive ourselves only as a reflection in the eyes of others".

Two years earlier W.I. Thomas and Waller (1932) created the notion of "definition of the situation". "People have a self consciousness, a sense of self located in tradition. Implicit in self is a view of self identity. We perceive things according to a view of self, the meaning of objects and situations is not something given, it is actively constructed and hence there may be disagreements over meaning. Traditionally it is the teacher who "defines the situation" in schools. Defining it in such a way as to achievement of the task" (Waller 1932:306).

This theoretical conceptualization was resurrected by D.H.Hargreaves in the 1970's in UK, when he researched interpersonal relations in education with a particular focus on interaction in the classroom and social class differences.

In the last 1970's and 1980's feminist sociologists began focussing attention on gender differences and the varied "definitions of the situation" of teachers, boys and girls, where the perceptions of each are masked by the sex role stereotypes of society and expectation effects of significant others.

The Classroom Interaction Analysis Tradition:

The leadership qualities of teachers manifested in their verbal and non-verbal interaction in the classroom has been a focus of research since the late 1940's. Collaborative work between men and women was already in place in the 1960's in evaluating the multifarious aspects of classroom interaction. (James Gallagher and Mary Jane Aschner 1963; E.J. Amidon & Peggy Amidon 1967).

It was recognized that the most important variable in the classroom is that of the teacher. The teacher behaviour in the classroom that is most pervasive and continuous is, of course, verbal action. The verbal and the non-verbal behaviour of teachers is according to Mary Aschner 'the language of responsible actions designed to influence the behaviour of those under instruction' (Mary Hughes 1962 cited in Hyman 1974:135).

There are two major traditions regarding the evaluation of classroom interaction and it seems important that the holistic perspective in the Flanders, Amidon, Galloway and Hough "Tradition" (1959-75) be complemented by the "minutiae" focus on aspects of the interaction of the classroom in the "Good and Brophy" tradition (1948-85). Both traditions firmly believe that the teacher could be helped to modify or change their classroom behaviour for the benefit of their students, and their own professional and personal growth.

For example, Amidon and Amidon (1967); Amidon & Flanders (1971); Riley and Schaffer (1979) produced interaction analysis training kits, Teaching Pattern Analysis Kits and manuals "based on the assumption that a teacher can be helped to define more accurately his/her own concept of desirable or ideal teacher behaviour and subsequently modify his/her behaviour in the direction of the ideal".

Good and Brophy (1987:48) too, identified ways in which teachers could obtain systematic and reliable feedback about their behaviour from their students, fellow teachers and a conceptual system for labelling their own behaviour.

In both traditions, teachers are encouraged to examine their own strengths and weaknesses, by focussing on personal characteristics and the teaching-learning process. Teachers in the context of gender equity are now encouraged to "become conscious of and own the problem of their differential treatment of girls; to research and test some aspect of the problem themselves, and to encourage students to monitor differential treatment in interaction. (Ramsay 1982; Cosgrove 1981; Doenau 1987).

Teacher Expectations and Self-fulfilling Prophecy:

Introduction:

Good and Brophy (1987:154-161) have also pursued a parallel line of research in "Teacher Expectations". The focus on teacher expectations and its effect on the achievement potential and personality development of pupils has a long tradition spanning the period 1948-1987.

Overview of Research:

Initially identified by Merton in a definitive article on "Self-fulfilling prophecy" in 1948, there was a resurgence of interest in teacher expectations in the mid-sixties: the classic study being Rosenthal and Jacobson's (1968) "Pygmalion in the Classroom". The 1970's research focussed on individual and social differences of students and teachers (Brophy and Good 1974). The 1980's has been a period of research that has focussed on the teacher's professional development in developing effective strategies to enhance school and teaching practices in order to minimize low and denigrating teacher expectation effects (Good & Brophy 1987:144 and 583-587).

Spasmodically through this mainstream research there has been a concern for gender and teacher expectations (Good & Brophy 1987:32-34) and a move towards empowering students to counter teacher expectations (Brattesani et al 1984; Weinstein et al 1982; Good and Brophy 1987).

What the research on teacher expectations has revealed:

Studies of school effectiveness and school improvement programmes reviewed by Good and Brophy (1986) indicate that high expectations and commitment to bringing about student achievement are part of a pattern of attitudes, beliefs and values that characterize schools that are successful in maximizing their students' learning gains.

Teachers' personal characteristics and beliefs about teaching-learning greatly determine the teacher expectations effects in the classroom (Good and Brophy 1987:137).

"Teacher expectations effects" play a significant role in shaping students' personal and social development. Self perception and behaviour can be affected by expectations communicated both directly and indirectly in the classroom.

"Besides affecting student achievement, teacher expectations can be expected to affect students' attitudes, beliefs, attributions, expectations, motivational patterns and classroom conduct".
(Good & Brophy 1987:144).

Good and Brophy (1987:153) caution that "when teachers fail to monitor and evaluate their attitudes, expectations and behaviour towards students, they can easily get caught in the vicious circle of failure and futility". Teacher expectations effects have a high profile in research into gender equity especially related to the classroom and career aspirations.

Professional development of teachers for improving teacher expectations, as it pertains to gender, is a crucial facet of improving the curriculum for girls in relation to their personality development, perceived competencies and confidence in the classroom, and for broadening their vision of life chances in the future.

Student Empowerment in Achieving Gender Equity, through challenging teacher expectations:

Good and Brophy (1987:121) speaking generally about strategies for changing teacher expectations, challenged students to own the problem.

"Students might prevent (teacher) expectations from being self fulfilling by countering their effects or resisting them in a way that makes the teacher change them". (Good & Brophy 1987:121).

Stanworth (1981:54) strongly believed that "The transformation of pupils consciousness - enabling them to have confidence in their capacity to alter the course of their own lives - is and must be an important step in the process of social transformation". (Stanworth 1981:54).

Research in Expectations Extended to Parents as "significant others" in Gender Equity:

As in other curricula concerned with equity, parental expectations and aspirations are also a focus of research and programmes to develop awareness and change in behaviour and beliefs about girls and future adult roles.

There is a clear implication in education for gender equity that changes in our perceptions of reality and behaviour can only be achieved if there is a conscious awareness of differential treatment of boys and girls and the adoption of strategies for change by teachers, administrators, pupils and parents alike.

Classroom Life and the Hidden Gender Curriculum:

"It seems 'natural' for practising teachers to pay more attention to boys in their classrooms" ... "teachers seem to have higher expectations of boys' potential, enjoy teaching boys more and spend more classroom time with boys" (Gilbert and Rowe 1989:18).

Several notable researchers have investigated the relationship between school and society including Clarricoates 1978; Spender 1980; Stanworth 1981; Connell et al 1982; Spender 1982; Parker 1983.

Clarricoates (1978:359) concluded from her primary classroom research in UK how the teachers' cultural expectations guided the behaviour of their pupils "There is no doubt in my mind that societal myths of stereotypes do influence teachers' beliefs about what girls are like and what boys are like. But what is most tragic of all is that girls' real ability is attributed to conformity to institutional expectations and academic achievement of girls is explained in terms of the feminine stereotype".

Connell et al (1982) pursued the influence of cultural expectations further and conceived the idea of a powerful gender-structured pattern of social relations spanning many social institutions, including the school, the family and the workplace. They described the chief characteristics of this pattern as that of "male dominance and female subordination". (Girls and Tomorrow 1985:16).

Spender (1982) and Parker (1983) focussed on the schools and observed the way this gender coded (and class coded) reality is imposed on administrators, teachers and students through modes of organization, curricula and especially patterns of human interaction.

This reality is internalized into each individual's self concept and has a major influence on behaviour and choices made. Boys emerge as "dominant and important" while girls remain "peripheral, unimportant and invisible". What was particularly important in Spender's research was that all the evidence was gathered in "a context in which teachers had declared that they did not engage in sex discriminatory practices". Spender does not blame the teachers but explains the apparent contradiction between their reported behaviour and the empirical evidence as being found "in a social system which perceives preferential treatment for males as the norm, as the status quo, and therefore they find such practices fair" (Spender cited in Ramsay 1981:11).

Clarricoates (1988) in her latest research has effected a comparative analysis of 4 schools in different catchment areas in UK and has shown how the form and development of gender relations is influenced by wider patterns of power and control. She includes a discussion of the ways teachers relate differently to boys and to girls in the classroom.

The work of Knight 1977; Sinclair et al 1977; Branson and Miller 1979; Connell et al 1982 cited in Girls and Tomorrow (1985:16) draws attention to the issue of the social class-gender interaction and the way in which working-class girls as a consequence are "the most educationally disadvantaged category".

The National Policy 1987 (cited in Newhouse April 1990:48-50) looks at Aboriginality, ethnicity, disability and isolation as further variables that diminish the life chances of girls - these too act in "the field of play of class-relations and gender-relations, we need to grasp the ways they each work on, reinforce and subvert each other" Connell (1982).

Classroom Interaction - sex bias and lack of gender inclusiveness:

Introduction:

Feminists involved in classroom interaction, assumed that classroom behaviours reflected the behaviours of men and women in the society to which teachers, children and young people belong.

"Differential treatment in classrooms while important would mean little if it were not for inequities in the world outside. The growth nurtured in classrooms is in many senses a function of what seems possible outside". (Maxime Green 1976:26).

Aries (1977) drew attention to the manifestation of subordinate, dependent and appeasing behaviour of women in male-female interactive settings. Spender (1980), analysed the English language and found that it actively denigrated women. Her subsequent research (Spender 1982), as an inveterate observer, came to similar conclusions as Aries, but added the dimension of non-verbal communication as a powerful aspect of women's offensive in sustaining their independence of spirit in a dependent, subordinate role.

Spender's research very much extends on the research of Brown and Gilman (1960), Brown and Ford (1961) and Brown (1965), with regard to dimensions of interpersonal relationships through the forms of address and the degree of power and/or solidarity attributed to them.

Stanworth (1981) wrote "Equal rights legislation alone is no guarantee of equality" we need to "unravel and transcend the more subtle processes in schools by which girls are taught to be women and boys to be men".

Their major task then in the early 1980's was to identify and highlight the taken for granted gender assumptions and the effects of sex role stereotyping in the classroom that perpetuate dependency and subordination of girls and women; and reinforce domination and power in boys and men (Acker et al 1984).

Ramsay (1982) delivered a powerful address on the sexual politics of the classroom and the preferential treatment and power of boys. This was a crucial advance in looking at the pervasiveness of sex role stereotyping in verbal interaction in the classroom and the role of the teacher.

"At the very heart of these classroom interactions are the socially and culturally produced stereotypical sex roles which since Girls, School and Society have universally been acknowledged to be incompatible with education" Ramsay (1982).

Focus on Teacher's Behaviour:

"There may be a gulf between the ideals teachers profess in the abstract and the prejudices they enact in the classroom" Nell Keddie ("Classroom Knowledge" cited in Stanworth 1981).

In Girls, School and Society (1975:69-70) there was a crucial statement with regard to the effect of the curriculum on the future life-chances of boys and girls.

"The Curriculum operates at two levels intentional and overt and the other often unintentional, and is "hidden" in taken for granted assumptions, in the omissions rather than the inclusions and in the messages passed to students as individuals of the school to prepare each sex for its own destiny". (Girls, School and Society, 1975 69-70).

Ramsay (1983:20-22) went further and focussed the cause of differential life chances of boys and girls firmly in the context of the classroom and the classroom interaction initiated and maintained by the teacher:

"Indeed we could change everything else that happens in schools produce the ideal non-sexist and counter sexist curricula materials, show all teachers how to use them, introduce the desirable balance of female role models and so on and yet if the classroom dynamics were not changed, I believe we would have achieved virtually nothing".

"Michelle Stanworth's study is an excellent example of the seemingly unthinking assumptions teachers made in her project of boys' and girls' abilities and potential" (Gilbert and Rowe 1989:81).

Stanworth (1981) found male teachers, more than female colleagues to view the sexes whom they teach in mixed groups as relatively discrete groups; that teachers of both sexes are more attached to and concerned for boys and more often reject girls, but the trend was more pronounced in males. Teachers' slowness at identifying girls, by name, compared with boys, has strong implications for their comfort and involvement. Teachers' advice to and expectations of girls is significantly different with regard to career, jobs and marriage interruptions with limited expectations for girls. Where girls are assertive in class, teachers are more likely to imagine her in a career at odds with traditional expectations. Girls are quieter, more diffident and less openly competitive than boys in class, so are perceived by teachers no matter how conscientious and capable as lacking the assertiveness and authoritative manner required for "masculine" occupations.

Pupil preconceptions about gender and teachers' authority and discipline:

Pupils according to Stanworth (1981) regarded men as more effective disciplinarians. "Gender and teaching success" showed boys' strong consensus that male teachers were best, females worst, girls were evenly divided in their choices.

Boys and girls were inclined to name male teachers as ones who know their subject best; get their message across, give sound advice on higher education and careers; and all in all are perceived as more competent. Both boys and girls agree they get more work done in class and treated more fairly. Much as pupils value academic competence, the quality of their involvement in classroom interaction is more influenced by teachers' success in interpersonal relationships. Boys and girls feel more at ease with teachers of their own sex. Lack of attention of the teacher equates with low self image in the classroom, especially for girls.

Classroom Interaction Analysis:

It is the boys who stand out vividly in classroom interaction. Boys' names appeared nearly 2 1/2 times as often as girls. Boys, according to pupils reports, are four times more likely to join in discussions. Twice as likely to demand attention, and twice as likely to be seen as model pupils. (Stanworth 1981)

"The implications is that both male and female pupils experience the classroom as a place where boys are the focus of activity and attention, particularly in forms of interaction initiated by teachers, while the girls are placed on the margins of classroom life." (supported by Spender 1982; Ramsay 1983; Parker 1982; Swann and Graddol 1988).

Views of Self from Stanworth's Research 1981:

Discriminatory behaviours have consequences for pupils' view of themselves. Boys have a greater chance of feeling valued. Girls are conscious of apparent indifference of teachers, by their not singling them out for attention, which leads to low self-esteem.

One crucial finding is that superficially trivial tokens of personal attention from teachers are the very signs that pupils look for in terms of the value, expectations, aspirations of the teacher and a measure of their self-value. (Note Dobry (1986) has attended to non-verbal communication in creating climates of equity in Home Economics classes)

Pupils' awareness of gender differences was in the early 1980's a largely unreflected domain (Stanworth 1981:46) and has been actively addressed in later research (Porro 1982; Jenkins 1983; Expanding Options 1984; Evans 1988).

The down grading of girls in their own eyes and male classmates is confirmed. Little communication of males between sexes led to erroneous perceptions of boys' superior attainments, even in history cross-sex comparison of marks is rare.

Girls are more aware of classmates and more circumspect in comments about them - namely both boys and girls. Boys' low opinion of girls is prevalent. Reluctance of boys to regard girls as equals was evident. (Stanworth 1981)

Girls were taken as a negative reference group, "faceless" adjectives were used time and again by boys. - boys feeling that "silence robs girls of any claim to individual identity and respect". Girls are an easy target for disdain, teachers ascribe other traits to girls, "lack of ambition and commitment", even outspoken girls were often condemned for "hogging the limelight or speaking out too aggressively."

Ramsay (1983), writing from the Australian perspective, recognized the "powerful and persuasive role which classroom interaction plays in determining what the results of schooling are for boys on the one hand and girls on the other". She defined Classroom Interaction as "Interaction between teacher and students, interactions between the students themselves, in terms of the time and space allocation and the language used". It is these factors that are the hidden curriculum which more than anything else determine girls' relative educational disadvantage. She believed they could be recognized and changed cheaply and instantaneously:

"All it requires is for teachers to open their ears and eyes to what is occurring every day in their classrooms".

Research, internationally and locally, has established its dimensions and details:

1. Teachers consistently give preferential treatment to boys. They acquire more educational resources and teachers play a role in this process.
2. Research on talk from several countries indicate teachers spend more time talking to boys than to girls. They allow boys to talk more than girls in the classroom. On average, from studies in Western Europe and USA, the teacher spends at least 2/3rd of their time talking to their male students and boys occupy at least 2/3rd of students' talking time in class. (Cosgrave 1981, Spender 1982).
3. The Research reveals that this preferential treatment seems fair to the teacher, to male students and to female students.
4. When teachers consciously break the 2/3rd rule they found girls embarrassed and discomforted by what appears to be unnatural attention. Boys protest at being neglected and teachers feel guilty about being unfair. Spender (1982) found the highest attempt achieved of 42% of teacher time spent with girls, led to severe classroom management problems from the boys and the teacher adamantly believing she/he had spent 90% of the time with the girls. Preferential treatment of boys "feels fair", to do otherwise feels "unfair to boys".

Ramsay (1983) says:

"The talk phenomenon is both a reflection of and a contributing factor to a whole range of interlocking classroom issues all of which have far-reaching educational consequences, in effect the boys have control of the curriculum, as well as the teachers' time and attention".

Sadkar and Sadkar (1989) firmly believe classroom interaction must include more female and minorities participation.

Content and Girls' interest:

Research on classroom interaction suggests when a lesson is planned and a subject is of particular interest (not necessarily exclusive) to girls, the boys will object in a vocal and disruptive way. Teachers introduce topics which are usually associated with males and are therefore valuing

and validating boys' experience. (Spender 1982; Ramsay 1983; Cooper 1987).

Interaction between students themselves:

Research in South Australian Schools between (1980-82) and Mahoney (1985) UK experience show that:

- 1 Boys have preferential access to almost all the other educational resources available at school, from classroom and playground space to use of equipment.
2. Boys own and occupy a radically disproportionate amount of space, both inside and outside. The normal defence is "harassment" of females by males, usually petty behaviours or irritations but constantly applied and verbal abuse.

Ramsay (1983) and Mahoney (1985) believe these dominant and aggressive behaviours of boys in school are not a biological attribute of maleness, but grows out of what has been seen as the traditional roles of men and women in society.

Questioning in the Classroom:

1. Questioning and the hidden 'gender' curriculum:

Questioning in the classroom is a complex operation. Ideally it is used to motivate students to think, to clarify explanations, to help pupils discuss effectively and to check on their learning. However there is a "hidden gender curriculum" revealing how women are marginalized by this aspect of classroom interaction.

Cooper (1987) reviewing the research on sex role differentiation in classroom interaction revealed that women are marginalized not only by the content, but by classroom interactional processes. Cooper identified several ways that the teacher communicates sex role expectations, which are deleterious to girls' self concepts, their potential for learning and thinking and future occupational choices, namely:

- o the use of sexist language
- o calling on male students more often than female students
- o asking male students questions requiring critical thinking or personal evaluation, while asking females questions requiring factual answers.
- o critical feedback of teachers focuses on girls' lack of knowledge or skill. (boys on their disruptive behaviour)
- o boys are allowed to dominate talk and discussion time and space in the classroom.

2. Questions and facilitating higher levels of thinking:

Leder (1989) noted that teachers' questions directed at boys were of high cognitive level, whereas girls were asked more procedural questions. She noted that in the only class where a relatively high number of sustained high cognitive level questions were addressed to girls, they scored higher in the Operations Test, than their male classmates.

Classroom Management:

Management problems - boys as "Attention Seekers":

Lockheed and Abigail (1984) showed from their two year study of 38 fourth and fifth grade classrooms that boys are more disruptive than girls and thus receive more teacher attention.

Network Inc (1984) in the USA, a three year research and development project found that in addition to receiving more praise, acceptance and remediation, boys incurred more criticism and conduct interaction than girls.

A verbatim transcription of a lesson in a class of 10 to 11 year olds was analysed by French J (1984) which supported the observation that male pupils receive more teacher attention than females. Among the reasons found was the tendency of boys to engage in strategies to secure attention.

Cooper 1987 found criticism of female students focuses on their lack of knowledge and skills, whereas criticism of male students focuses on disruptive behaviours.

Croll (1985) found that primary school boys received a higher average level of individual attention from their teachers. She sees this imbalance as a problem of classroom management rather than of sexist bias. In the same study, through systematic observations of children from 34 classrooms, she showed that children with learning problems interact more with the teacher than other children and that boys in this category outnumbered girls by two to one. Among reasons given for this imbalance is the tendency for boys to engage in strategies to secure attention.

Mahoney (1985) argues that boys not girls have been the beneficiaries of coeducation, they dominate the physical and linguistic space and intimidate girls and teachers into giving them control. Her UK research identifies the dominance and power strategies of boys in coeducational schools and questions whether girls are really able to flourish in such an environment. It is clear that teachers need to be vigilant about their own reinforcing behaviour which encourages attention seeking, dominance and power strategies of boys in the school.

Grouping in Classrooms A need to encourage cross sex interaction for democratic social participation.

Sagar and Schofield (1980) focussed on the classroom behaviours of black and white six grade boys and girls in the USA. Their school was advertised as "a model of integrated behaviour". The first study consisted of coded observations of classroom behaviour and the second study was a sociometric analysis. Data from both studies indicated the over riding importance of gender as a grouping variable and the noticeable

impact of race. The findings suggest gender clustering reflects a "genuine social barrier and is not merely an incidental product of divergent gender specific interests". The results of the study suggested that greatest attention be given to gender integration as an aspect of the larger goal of social integration.

Sagar (1983) found that boys interacted more across racial lines than did girls; and blacks were almost twice as likely as whites to be the source of cross-race interactions. Peer behaviours were more likely to be task related when directed toward white rather than black interactants.

The Network (1984) research and development project found that half of typical (control) classes were characterized by sex segregated seating and grouping patterns.

Scott (1985) is very much in favour of cross-sex interaction in social studies classrooms. She strongly believes that social studies education must provide all students with the ability to fully participate in a democratic community. In her article, she examines the research on cross-sex communication and children's peer interactions and suggests strategies that social studies teachers can implement to increase cross-sex interactions.

Grouping in Classrooms Single sex grouping as a form of affirmative action for girls in scholastic achievement.

Horner (1972) suggested that there may be advantages for girls in girls-only groupings to try to eliminate girls' fear of success in a mixed competitive environment.

Parker (1976) cited in Girls and Tomorrow (1985:35) perceives single-sex girls' groupings on the positive side as being free from sexual harassment, territorial defence behaviours of boys, with girls having exclusive ownership of teacher time and space. These types of conditions may be conducive to girls' learning in traditional male disciplines such as mathematics and the physical sciences, given that teachers are aware of the influence of cultural expectations for women and girls on their own classroom behaviour.

Currently girls-only classes are established in Physics at Kent Street Senior High School and in Executive Education for girls at Willetton Senior High School in Western Australia (1990).

"At present the most constructive and helpful approach appears to be for coeducational and single sex schools to learn from each other, and for each to implement, wherever possible, features of the other's environment which assist in the elimination of sexism from education". Girls and Tomorrow, (1985:36).

PROFESSIONAL DEVELOPMENT OF TEACHERS - Related to Communication in the School and Classroom:

1. Wider School Communications:

In 1988, Evans carried out a sociological study of teachers, pupils and parents in an Australian primary school. She focussed on the gender relations embedded in the everyday lives and biographies of teachers and parents, explaining the day to day operations of the school. She perceived that the disputes, debates, power play and dealings between and amongst administrators, teachers and parents were integral to gender relations that crisscrossed their lives.

(a) Teachers, Parents and Community Members:

Evans (1989:82-83) believes it is imperative for teachers to reflect critically on the parts we all play in the "living curricula" of school communities. This encompasses not only the things we do and are to the children and young people, but also the things we expect and require of other adults in the school communities. If girls are to "learn to be women with equal power, responsibility and rewards to men, then it seems crucial that they should be presented with this as reality in the adult gender relationships in school communities". Likewise, Evans says, with profound insight, boys need to recognize the corollary of this position.

(b) Student Awareness of the "Gender Agenda": (After Evans 1988)

In Australia, the "living curricula" are gaining even more prominence in school life, with recent developments in educational policies and practices toward greater community involvement, participation and responsibility. The dependence on strongly gender divided forms of voluntary work will increase. Teachers should encourage children and young adults to be critically aware of both the gender structures that surround them and of gender relations they are constructing for themselves.

As Ramsay (1983) pointed out the difficulty for girls is the way "acquiescence and passivity, which the culturally mediated ethic of femininity promotes in girls, leaves them with few avenues of protest."

2. Classroom Interactions:

(a) The Role of the Teacher:

Swann and Graddol (1988) provided an interesting overview of classroom interaction which repeatedly illustrated how teachers give more attention to boys, consider boys more interesting to listen to, direct more of their questions to boys and expect more of the boys. They concluded that if change is to occur in literacy classrooms it must first occur with teachers.

"No amount of new curriculum material will counteract the role of the teacher on issues like these" (Gilbert and Rowe 1989:81).

(b) Advise to Teachers on the 'Gender Agenda' in Classrooms:

- (i) A first and essential step is for teachers themselves to become conscious of and hence own the problem, by attending to equity in verbal and non-verbal language and interaction. (Ramsay 1982; Dobry 1986).
- (ii) Teachers should conduct some research into a chosen aspect of the problem and test the research themselves (Cosgrove 1981; Ramsay 1982; French & French 1984; Doenau 1987).

Using data then available, the teachers get the students to monitor the chosen phenomenon of differentiated treatment in interaction without being too conscious that this is what they are doing (Ramsay 1983).

- (iii) In the classroom, teachers should make a conscious effort to channel more of their attention and energies to quieter pupils since the neglect of quiet pupils works, on the whole to the disadvantage of girls. (Stanworth 1981:54).
- (iv) Teachers should give high priority to reshape the sexual distribution of interaction in the classroom to create an atmosphere in which the reticent (often girls) can more readily participate and be positively encouraged to voice their opinions and ideas. This requires ingenuity and effort on the part of the teacher. (Stanworth 1981).
- (v) Active participation of all pupils in classroom activities is a fundamental responsibility of the "transformative teacher" who will no longer tolerate the "status quo". This has a two fold effect:
 - (a) valuable in pupils' assessments of their relative capabilities of themselves and male and female classmates. So valuable for present and future education and confidence in adult roles.
 - (b) may influence teachers' judgements of the needs and abilities of boys and girls.

Intervention Programmes for Teachers and Tertiary Educators (1982-1987)

Sadkar and Sadkar (1985) conducted a three year study and found classroom interaction between teachers and students deficient in both equality and quality. They advocated that teachers receive specific training in the importance of precise reactions, equitably delivered.

A number of innovatory approaches will be discussed and are presented chronologically.

Focus on Modification of the Pupils' Behaviour by Active Intervention:

Porro (1982) carried out a research study which measured the effects of a non-sexist classroom environment on the sex role attitudes of first grade pupils. It was an action research and the method initiated was a process approach, characterised by two phases. A preactive phase in which the classroom environment was modified to support a non-sexist perspective and an interactive phase, in which stereotypical attitudes and behaviours among the students were systematically treated, through activities, materials and teaching strategies.

Intervention Strategies to Modify Teachers' Classroom Interaction Behaviour to Become more Equitable:

1. Young and Wyman (1982) conducted a number of workshops that provided information on sexism in communication and helped teachers to identify differential treatment of male and female students. The experimental group were then compared with a control group on the nature of their interactions with students based on observer ratings on two kinds of instruments.
 - (a) The PIT Model which quantified verbal and non-verbal behaviours in personal events (emotions); institutional events (classroom management) and task events (teaching and learning subject matter).
 - (b) IDER Model which categorized teachers' verbal behaviour as encouraging or restricting.

The findings did support that intervention prompted teachers to be more encouraging and direct, though it was difficult to conclude that the workshops had resulted in more equitable behaviours of the experimental group.

2. Jenkins et al (1983) designed a booklet to help American professors assess how they were presenting subject matter to their students. The authors believed that the professors' cultural and personal backgrounds affected the way they transmitted information and interacted with men and women students in their classes.

The first section of the booklet "Student-Faculty Communication Patterns" identified and proposed solutions to problems of stereotyping, biases in language structure and usage, and patterns of discrimination in the classroom that can affect women and men of different cultural backgrounds.

The second section, "The Student Performance Questionnaire" was specifically designed to gain students' opinions of classroom interaction patterns according to the student's age, sex or race. (which supported Stanworth (1981), Ramsay's (1982) belief in 'empowering' students to transform classrooms).

3. NETWORK (1984), a three year research and development project in America investigated sex bias in classroom interactions and developed training strategies to reduce or eliminate them. Two training interventions were taught to two groups of selected 4th, 5th and 8th grade teachers. One was based on a micro-teaching model and applied in 44 classrooms in Washington DC while the other, based on a collegial problem solving model, was applied in 24 classrooms in New England.

A comparable group of 34 teachers comprised the control group. All classrooms were observed by raters trained in INTERSECT Observation System. Teachers in the two training interventions were less biased in their teaching patterns. Of the two interventions the micro-teaching was seen as most equitable.

A Holistic Approach Targeting all personnel in an Education System:

Expanding Options (1984) developed at the Centre for Studies of the Person in San Diego California is a holistic intervention programme that target all groups in the school system. Facilitators are initially trained to conduct sex equity workshops to expand awareness of sexism and to increase sex affirmative behaviour in the educational environment. The programme consists of seven sessions and is a sequential learning experience, comprehensively documented in guides that meet the specific needs of secondary school student leaders, elementary teachers, secondary teachers, support staff, students, administrators, parents and guidance officers/counsellors.

Classroom Interaction - Interventions for Changing Teacher Behaviour:

Bossert (1982) suggested an interaction model of sex equity in the classroom to overcome some of the problems in recent research on sex differences in Classroom Interaction.

Sadker et al (1984) implemented a three year research and development project to develop new knowledge about sex equity in classroom interactions and to develop successful techniques for reducing or eliminating sex-biased interaction.

Two interventions were developed to train teachers in more equitable instructional behaviours. In Washington DC, teachers of 4th, 6th and 8th grade classrooms were trained according to an intervention based on a microteaching model, whereas teachers of the same grades in New England participated in a training intervention based on a collegial problem solving model. The sample consisted of 102 classrooms located in six school districts.

All classrooms were observed by trained raters in INTERSECT (Interactions for Sex Equity in Classroom Teaching Observation System) Primary Analysis focussed on the nature of the interaction patterns and the distribution of interaction between male and female students. In the second phase differences in teacher interaction with boys and girls across treatment groups were examined. Statistically significant differences among conditions and between male and female students were consistent across all approaches to data analysis.

Evaluation of the effects of Training in Sex Equitable and Effective Interaction Skills:

In another American study, Long et al (1986) focussed on sex biased teacher-student interactions in the tertiary classroom; and the distribution, precision and quality of teacher responses to student verbal behaviour. Twenty three professors participated in a two and a half day training workshop focussing on the elimination of sex-biased teacher-student interactions in the classroom and practising the distribution, precision and quality of their responses to student verbal behaviour. Their classes were observed three times using the INTERSECT observation instrument to code classroom interactions compared to the control group of 23 professors, the teachers who underwent training had significantly more interactions with students.

Training increased interaction by 38%, reduced the percentage of salient students who monopolised interaction, and also reduced the percentage of silent or non participatory students. More students participated equitably in the classrooms of trained teachers. Training also increased the range and precision of teacher reactions to student responses. Over half of the untrained teachers' reaction were in the non-evaluative, diffuse response, while trained teachers used more praise, remediation and criticism which gave more precise and helpful feedback to students.

Australian Research and Teacher's Action Research for Effective Change in Classroom Interaction:

Doenau (1987) in Australia evaluated "teachers fairness to girls" by raising questions on how teachers interact with girls and boys in the classrooms. Do they treat them differently; in what ways; are they aware of the differences; can awareness be increased and can interaction patterns be changed? and, applying these questions to critically evaluate twenty years of classroom observation research. He then, proffered advice to teachers based on the strength of affirming research findings.

Doenau (1987:187-191) advised teachers to become their own action researchers and to progress through a three stage process. Teachers were advised to begin with very simple observations of verbal behaviour. (eg. Cosgrove (1981) Professional journaling on the number of questions asked by male and female students and the percentage of his/her time talking to members of the opposite sex; Spender (1982) percentages of time spent with males and female students or French and French (1984) on the number of interaction turns). This would involve the use of an audio tape and transcripts with follow up analyses to identify "the skeleton of your interaction habits".

Stage Two may involve more complex analyses of recorded sessions such as the various types of questions asked, length of responses and to whom (Ref Gallagher and Aschner 1963).

The crucial final stage is "to plan to change" and the same recording and analysis proceedings are considered essential to record improvements and change. Doenau considers that pupil-pupil interactions are also valuable to record and cites Carss and Barnes (1980) research into discussions of pairs of boys and girls as they worked on mathematics problems.

Finally Doenau (1987:193) encourages teachers to read classic books on interaction analysis (eg. Good and Brophy (1987); Dunkin and Biddle (1974); and Wilkinson & Marrett's (1985) "Gender Differences in Classroom Interaction").

Student Empowerment in the Classroom and Expanding Their own Life Chances:

Remediation of student behaviour is one approach to changing the behaviour of boys and girls in school. However in recent years much consideration has been given to consciously educating students to be aware of sex discrimination and to take an active part in countering invidious sex stereotyping.

1. Tertiary Classrooms - Evaluation by students.

Johnson and Hall (1984) wrote the first national report on differential treatment of men and women students in college classrooms in the USA. This report was distributed across the country to encourage behaviour change and attitude change. They identified over 35 kinds of behaviours by which lecturers could treat men and women students differently and included over one hundred recommendations for evaluation and change. They prescribe a whole campus approach including workshops for administrators, faculty and students, and in-class units to increase students' awareness of gender issues.

The writers suggest the need for classroom interaction research on sex discrimination which involved both lecturers' and students' evaluation through survey and classroom interaction observation. Change, they believe, comes from both lecturers' and students' empowerment to change their own behaviour and that of the other interactors in the classroom.

2. School Classrooms - Student Awareness and Ownership of Life Chances:

Calabrese et al (1984) designed an activity guide to supplement the "Equal Goals in Occupations" Source-book (1984), developed by the Hawaii Education Department. The guide includes activities teachers can use to reduce the prevailing sex role stereotypes and biases held by students.

Teachers are initially encouraged to examine their own sex stereotypical biases and are alerted to reasons why they should eliminate them in their classrooms. Students are empowered by a series of workshops; to develop awareness of the basic issues of sex bias and stereotyping; to examine their own biases and stereotypes through activities and finally a deepening of their knowledge of the many occupations open to them, especially non-traditional roles.

3. Evaluating courses for the Inclusion of New Scholarship on Women - student involvement in Universities:

O'Barr (1988) developed a comprehensive questionnaire intended for comprehensive survey purposes in tertiary institutions to help students and faculty members evaluate how their courses deal with women. They were multiple choice and essay type questions related

to classroom interaction, visibility of women in the curriculum and general evaluation. Questions that provided a frame of reference for future thinking were included, which suggested the need for qualitative change over time and careful monitoring to ensure the inclusion of New Scholarship on Women in the curriculum, and to provide balance in predominantly male oriented curricula in the future.

4. Critical Thinking Skills - Students and Gender Issues:

Zeller (1988) has designed a classroom unit to motivate students' critical thinking skills concerning sex discrimination. The package includes data sets for student analysis, instructions on assignment writing, and suggestions for enhancing critical thinking skills.

Mathematics, Science, Computer Studies and Industrial Arts

Classroom Interaction and gender will be discussed within their special curriculum concerns. (Newhouse 1990:Part 3 Subject Curricula)

Food for Thought:

The indepth research presented here in affirming the hidden gender curriculum pervading classroom interactions will hopefully meet the criticism made by Clarke and Dart (1988) in showing that past and current research has in fact been based on "highly varied, complex, scientifically and sociologically based perspectives" and not "a simplistic, but politically appealing sex difference approach".

RECOMMENDATIONS - SCHOOL AND CLASSROOM INTERACTION FOR GENDER EQUITY:

It is recommended that:

1. all educators, administrators and teachers be made consciously aware of the prejudices, attitudes, values, beliefs and expectations, they carry into the school and classroom.
2. teachers, educators and administrators analyse their own personality development and the prejudices they hold with regard to individuals of different race, gender, class and ethnicity.
3. teachers and educators be attuned to how the construction of gender works in the broader society and is brought into the classroom as cultural expectations of boys and girls.
4. the school personnel be aware of the 'hidden' gender curriculum in communication between parents, members of the community, administrators and teacher; and that they work actively towards countering these inequities.
5. teachers analyse their expectations of boys and girls since these form the basis of their own belief and value system.

6. parents are also educated towards understanding the 'hidden gender' curriculum, particularly in view of their increased participation in the life of the school in Western Australia.
7. students be empowered by being made aware of gender inequities and provided with ways of actively countering erroneous administrator, counsellor and teacher expectations and behaviours in the school and classroom.
8. gender equity programmes be initiated in schools and tertiary institutions to develop awareness, promote attitude change and strategies that can be used by teachers, administrators, counsellors, parents, support staff and students to bring about changes in behaviour that promote equitable treatment and expand life chances for boys and girls.
9. such inservice and professional development programmes develop awareness that cultural sex stereotype expectations are brought into the educational institution and classroom in the belief and value systems of administrators, teachers, parents and pupils alike.
10. inservice and professional development programme implemented by the institution, provides guide-lines for effecting and monitoring change towards gender equity in the school and classroom.
11. teachers consciously create classroom climates of gender equity and excellence.
12. teachers consider as a priority that girls become an integral, valued, contributing part of the interaction of the classroom, whether at pre-primary, primary, secondary or in tertiary institutions, and are not marginalized.
13. there be a focus on interaction analysis to foster classrooms of equity and excellence.
14. lecturers, in pre and post teacher education, develop skills in recording and analysing their behaviour in the classroom, in the context of 'gender fairness'.
15. teachers monitor their verbal and non verbal behaviours by paying particular attention to:
 - o differential time given to particular students in the classroom.
 - o quality of questioning, level of difficulty, length, duration, frequency and distribution to boys and girls.
 - o incidence and causes of poor behaviour, particularly 'attention seeking' behaviour of boys.
 - o "encouraging behaviour" of teachers towards boys and girls
 - o reducing communication avoidance of girls

- o their non-verbal communication, which conveys feelings, acceptance and positive regard to students, particularly girls.
- 16. all potential teachers and practising teachers be provided with the ability to monitor the quality of their classroom interaction with regard to promoting the full potential of students academically; and actively enhancing self esteem and self worth in all students, especially girls.
- 17. student empowerment be fostered by developing awareness of gender inequities; fostering critical thinking skills; debating gender issues, and actively countering cultural and personal expectations of teachers which result in gender biased interactions in the classroom.
- 18. classroom management strategies be adopted to counter the 'attention seeking' and 'attention getting' behaviour of boys, using both interactionist and non-interventionist approaches.
- 19. consideration be given to cross sex grouping especially in social science classes to promote democratic participation for present and future life roles in society.
- 20. careful thought be given to the advantages and disadvantages of single sex grouping for academic achievement of girls, especially in Mathematics, Science and Career Education, Computer Education and Industrial Arts.

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LEARNING STYLES

"Teacher sensitivity to the particular needs and learning styles of boys and girls is essential" Girls and Tomorrow, 1985:36.

According to Hunt (cited in Davidson 1981:642) "Learning style describes a student in terms of those educational conditions under which she/he is most likely to learn". Dunn, Dunn and Price (1981) are more specific and describe learning style as "the manner in which at least 19 different elements from basic stimuli affect a person's ability to absorb and retain information" and is "the aggregate of the student's own opinion about the way he or she learns best" (Davidson 1981:642).

Learning style to Keefe (1988) is an "umbrella" term and a composite of certain cognitive (including cognitive style), affective and physiological factors that are "good indicators of how a learner perceives, interacts with and responds to the learning environment". Learning style indicates how a student learns and likes to learn. The style of the individual student reflects "personality development, motivation, genetic coding and adaptation to the environment".

Learning style is both "durable" and "malleable", according to Hunt (1981), and should be perceived as a positive trait. There is a general belief that a student's learning style can be gradually adapted and extended developmentally through teacher intervention and student's active control of their cognitive skills to effect "better ways of processing information; a greater responsibility for their own learning; skills of metacognitive awareness; a cognisance of their prevailing attitudes, beliefs and values; and a positive acceptance of preferences in environments for learning without severally judging self" (Keefe 1988).

Ristow, et al 1985; Keefe 1988 and Atchison and Brown 1988 advocate the use of learning style profiles, gained from student self-perceptions, to accommodate or vary the classroom environment; to remediate faulty processing, to change affective modalities that inhibit learning and the development of creative potential. Hunter (1979) and Hunt (1981), on the other hand, advocate more informal diagnoses obtained through group feedback or sensitive observation by the teacher, with the "goal of increasing the student's independence and initiative, that is extending his/her learning style".

*In the research connected with the curriculum for girls, the onus is placed upon the teacher to make worthwhile decisions as to the suitability and supportiveness of the learning environments they are creating for girls. These decisions should be based not only on needs but on the preferred learning styles of girls. Information has been gathered from informal feedback of women's perceptions of learning style preferences (Foster 1989:34); learning style profiles completed by students (Ristow et al 1985; Atchison and Brown 1988) and skilled analysis of their own preferred learning style which can affect teachers' teaching style (Keefe 1988). The most pressing need in creating climates of equity is to convince teachers that learning style is an important trait to consider. This requires attitude change and a willingness to accept that the research evidence is valid.

Keefe (1988) also suggests that "Students who understand their learning styles and who exercise active control over their cognitive skills, do better in school. They are better adjusted, have more positive attitudes toward learning and achieve at higher levels than their less skilled peers. Certainly in the area of gender equity, student responsibility for their own learning, assertiveness training and a positive attitude towards their preferred learning styles is increasingly being encouraged.

Research Related to the Cognitive Dimension of Learning Style of Girls & Women:

Cognitive Style reflects "different ways in which person perceives the world, solves problems, learns a task, conceptualizes information".

It is important to note that Cognitive Style mediates between motivation and emotion on the one hand and cognition on the other, thus according to Shouksmith (1970):

"The preferred style of cognitive operation can be related to the personality and motivation of the individual in the way they perceive, understand and process problems."

Witkin (1974); Sutherland (1981) and Sjöberg (1989) have found girls to be more field dependent and person oriented which affects not only the way they prefer to learn in school and the classroom, but their choices of later "person-oriented" careers.

Sex differences have been identified in Cognitive Style for example on the dimensions of reflectively/impulsivity, cautiousness/risk taking (Kagan 1969) and field dependent/field independent (Witkin 1974). These differences in perception suggest to Sutherland (1981:88) "a more general difference in personality and in subject interests". This leads to differences in physical environment preferences and differences in social and emotional states conducive to learning. This, for example, may involve acknowledging that different learning styles of girls in mathematics requires more "time to think" in contextual problem solving; or in Science, relating the discipline more to the reality of women by borrowing teaching strategies from the Arts. We may in the 21st century need to make extended use of learning profiles, acknowledging the unique constellations in cognitive style, affective and physiological factors. (Keefe 1988).

The Validity of Learning Style Inventories in Illuminating Individual Differences in Learning Style:

An evaluation of the effectiveness of a battery of learning style inventories with regard to "reading achievement" was carried out by Atchison and Brown (1988) using the Gregoric Style Delineator; Hunt Paragraph Completion Method; Renzulli-Smith Learning Style inventory and Carbo Reading Style inventory. They found:

- (a) The Hunt Paragraph Completion Method useful in identifying learning style preferences for students with low, average and high reading achievement, who prefer much or little structure in their learning environments.

- (b) The Carbo Reading Style Inventory would be useful for identifying learning style preferences for students in low, average and high reading achievements who prefer kinaesthetic or auditory learning styles.

Ristow et al (1985) found significant differences by gender in independent study and programmed instruction when the Renzulli-Smith learning style inventory was administered to gifted and above average students (Grade 6-8) in rural schools in America. There were also significant differences between gifted and above average children on the dimensions of independent study, discussions and programmed instructions.

Zelazek (1986) using the Grashna-Riechmann Student Learning Scales, which focussed on avoidant, collaborative, dependent, competitive, independent and participatory traits. There were interesting findings with regard to learning styles, gender and life stages, and adult learning.

Hauck (1985) using Torrance's "Your Style of Learning and Thinking" (SOLAT) to categorize cerebral dominance of 8th grade students, according to left/right or mixed (one or other used as needed) or integrated (where both hemispheres were used simultaneously). Information mapping strategies were identified for these students, which acted as an advance organizer. In a post test to assess learning, significant differences were found between hemispheric dominance and test scores. Students with an "integrated" style had higher test scores than left dominated students. Further, integrated and right style students had a higher reading level than left style. There were no significant gender differences in hemispheric dominance; though males scored higher on the test.

Evidence of learning style differences using Topographic Brain Imaging and Patterns of Electrical Brain Activity:

Using Topographic Brain Imaging and discriminate patterns of Electrical brain activity, clear gender differences in patterning in the cerebral cortex were found as right handed students performed a series of recognition and memory tasks. In a serial learning task, males recalled significantly more words than females, possibly due to different strategies used by men and women. (Dunn et al 1988).

Cognitive Style, Gender and Musical Tasks:

Schmidt and Sinor (1986) investigated convergent and divergent musical tasks as a function of the cognitive style dimension "impulsivity/reflection" with 47 second graders. Significant relationships were found for cognitive style and gender on measures of tone, rhythm and creative music thinking.

Persistence of Cognitive Style, Learning Style:

- (1) Chang (1984) provided an experimental group of 5-6 year olds with a socialization experience enhancing self recognition of body characteristics, self acceptance and sense of self, as a separate independent entity. This training enhanced identity, but did not affect cognitive style.

- (2) Zelazek (1986) focussed research on learning styles, gender and life cycle stages with regard to graduate students, aged between 22-50 years of age. It was found that they used different learning styles, that men were more avoidant and women more participatory - and the fact that individuals became more independent and participatory with later life cycle stages is a significant finding for adult learning.
- (3) Davenport (1986) found gender was related to learning style in elders. Females scored higher than males on Abstract Random Channel; males scored higher than females on Abstract Sequential Channel. Both genders scored higher on Concrete Sequential Channel.
- (4) According to Allen et al (1987), female undergraduate students preferred collaborative and participative learning styles, whereas males preferred more independent and avoidant learning styles. Students perceived female instructors as assigning higher grades and more immediate than male instructors. However, Communication Avoidance was seen as a better predictor of learning achievement than learning style variants.
- (5) A group of secondary Agriculture students were analysed for preferred learning styles by Cox (1988). Most preferred active, practical, observation-centred learning and there was evidence of grade level and gender influencing learning style.
- (6) Hines and Seidman (1988) studied female undergraduate students in a research unit where they were using CAI mode. They found them more computer-phobic than males and less likely to have taken a computer course. However their achievement scores were significantly higher. They were observed to have a more concrete learning style and were less reflective in their style of learning.
- (7) Carss (1981) (cited in Doenau (1987) found in Year 8 Mathematics classrooms that average and above-average females spent more time on process talk (problem solving strategies) as they worked in pairs. The researcher felt that this strategy was counter productive since the rewards are for "getting the right answer" and the direct approach of males is likely to lead to that result.
- (8) Ohuche, N. (1984) explored the Universality of gender differences on Piagetian tasks of horizontality and verticality with a stratified random sample of 192 Igbo primary, secondary and university students. Some results supported previous findings on sex differences in reference task performance but other findings did not fit the predicted pattern.
- (9) Tamir (1985) carried out a meta analysis of 54 articles and dissertations dealing with cognitive preferences. Information included test reliability, comparative studies, grade level, gender, disciplines and curricula, cognitive preferences and career orientation, science achievement, interest, aptitude and effect sizes. Results offered evidence of construct validity of cognitive preferences

- (10) Grabinger and Jonassen (1988) added to the growing research into "Independent Study" preferences according to personality, cognitive style and gender. They found those electing for independent study had a high need for achievement, an internal basis of control and preferred "active experimentation" learning. Gender, ability and major teaching area were not regarded as an issue for these undergraduate Education students.
- (11) Baxter (1987) was concerned with the challenge for equitable climates to promote epistemological development in first year male and female university students, since males, at present, demonstrate more growth. She investigated sex differences on Perry's Stages of Epistemological development and found evidence of gender related patterns in the use of certain reasoning structures. Where knowledge is perceived as certain, females expressed hesitancy to speak in class or criticize authority, whilst males actively and critically searched for answers, engaging peers in argument and quizzing. Where some uncertainty began, females tended to adopt a subjective stance, whereas males worked through uncertainty with logic and debate.
- (12) A paper by Baker and Belland (1987) considered research on visual-spatial learning differences between males and females and how such differences can be overcome in science and mathematics curricula. It is suggested that one reason females are under-represented in the areas of mathematics and science is that they tend to score lower on spatial visualization aptitude measures, which are an important predictive measure for success in the fields of engineering, science, drafting, and designing. Possible explanations for these lower scores are explored, and it is suggested that research be undertaken to address the issue of how to improve the curriculum to encourage the development of visual-spatial experiences for women and girls. (See also Whyte 1986)

Learning Style and Students' "Environment" Preferences:

- (1) The results of a study, by Harpole (1987), indicated that male chemistry students (Grade 10 & 11) preferred situations that involved numbers and logic, computing and solving mathematical problems and benefitted from course work that was logically and clearly organized and assignments that were meaningful. Female chemistry students tended to need laboratory activities in which they could work with people and help each other. She suggested that the planning of different types of laboratory activities for males and females may enhance laboratory skills, and that consideration should be given to the structure of instructional procedures with females being allowed to set their own objectives and males given more logical, well defined instructional procedures.
- (2) "Participants at a workshop of 'Women's Learning' at the 1985 Conference of the Australian Women's Education Coalition identified the following characteristics as important facilitators of their own learning as well as that of their female students:
 - o group work featuring cooperation, sharing, negotiation, trust, consensus, acceptance of difference and the opportunity to speak freely

- o the sharing of information, knowledge and skills
- o being in a women-only learning situation at least part of the time, thus facilitating the authentication and validation of female experience
- o exposure to consciousness-raising activities and feminist principles
- o where possible, setting one's own learning agenda by negotiation
- o the inclusion and visibility of women's history, culture and knowledge
- o the experience of being taken seriously, where by contributing to confidence and self-esteem, increased learning potential
- o the absence of the concept of failure
- o attention to the physical environment and other details which make women feel secure". (Foster 1989:33)

The Impact of Affective Factors on Learning Style of Girls:

A study of exceptional secondary biology teachers was conducted to determine what factors might be important in encouraging young women to remain on the "science track" during high school.

Results indicated that the best predictor of science career interest for females was positive feelings about their science classes and that, compared to males, females expressed less confidence in their scientific and problem solving abilities and reported less frequent participation in curricular and extra curricular science activities. (Matyas 1984).

Researchers' Modifications to Learning Style for More Effective Individual Learning and Creativity:

- (1) Schuetz (1981) in pursuit of Geragogy, encouraged Elders in self directed learning and use of learning objectives related to life experiences and problems.
- (2) George and Schaer's (1986) results indicated that with kindergarten children story-telling and dramatization were significantly more effective in facilitating recall than television. Analysis of gender differences did not reveal significant differences in learning modes. Modelling, dramatization and story-telling were seen as viable means of stimulating children's imagination, which ultimately leads to a higher cognitive level.
- (3) Scott (1988) focussed on six traits that the most gifted learners displayed related to superior concentration skills, field independence, reflection, internal locus of control, active learning and persistence and, in her paper, has suggested ways in which teachers can encourage other students to develop more effective learning strategies.

- (4) Baxter (1988) revealed in her longitudinal study on epistemological development that both males and females increased their intellectual capacity as an outcome of higher education. Learning styles changed but did not appear to impact differently on the epistemological growth of males and females. An analysis of student perceptions of their learning environment revealed subtle differences in the environment experienced by men and women. Baxter offers suggestions for creating equitable environments.

Evaluation: Learning Styles Considered:

Schmidt (1984) expressed the "need to evaluate children's learning differently through different styles". Kagan (1988) recently examined differences between courses in computer programming and computer literacy and relationships between achievement in these courses with student personality traits, cognitive styles and gender.

Preferred Learning Styles of Girls and Selection of Teaching Strategies in Science:

Kingsland (1989:45); Dangerfield (1989:50); Beruldsen (1989:56); Villiers (1989:61); Leggett (1989:76); Stocklmayer (1989:77) cognisant of the preferred learning styles of girls and young women, have successfully implemented teaching strategies in science education to foster both learning and positive attitudes, particularly in the physical sciences of Chemistry and Physics.

Learning Styles of Girls and Career Choices:

Sjoberg (1989:36) believes it "should be considered as problematic that the persons recruited into technology seem to be people that are not oriented to other people ..". science should recruit young people with a "wider range of values and motivations" ... and "more girls into technology may give this result", since they are "person oriented" in cognitive style.

Preferred Learning Styles - Recommendations:

It is recommended that teachers and educators:

- o familiarize themselves with current research related to learning styles and extrapolate the findings to meet the needs of the age group they are presently teaching.
- o develop a positive attitude towards the need to modify environments to accommodate learning styles.
- o develop the strategies and skills necessary to create equitable learning environments to accommodate to the needs and preferred learning styles of boys and girls.
- o regard learning styles as stable, though capable of progressive development throughout the life stages.
- o consider how preferred learning style might disadvantage girls in the learning process and evaluation of learning.

- o carefully select teaching strategies that equate with preferred learning styles for girls.
- o encourage student to modify, adapt and extent their preferred learning styles to become more effective learners and creative problem solvers.

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CAREER EDUCATION FOR GIRLS:

Introduction:

Many strands evolved from the vocational, economic link with the Education of girls. Most notably, Career Education has progressively evolved over the past twenty two years, especially in its concern with equity for girls.

Initially, there was growing concern with regard to the role of the teacher and his/her biases which resulted in differing expectations, differential valuing of girls and boys; and the limiting of girls' aspirations. This resulted in every aspect of the teacher's role coming under close scrutiny.

Presently, there is an emphasis on parental involvement and re-education with regard to their aspirations and expectations of daughters. Most recently, there has been a drive towards student empowerment primarily through developing awareness of gender issues in career opportunities, laws related to Affirmative Action and ways of countering the vicious cycle of inequities to increase life chances of girls.

Administrators and counsellors, particularly in America, are subject to training units to reduce gender bias in career education and counselling. There is a focus on women teachers and women in higher education and their marginality in these institutions which present "poor achieving role models" for girls.

Intervention programmes beginning with pre-schoolers and terminating with mature aged women are increasingly being implemented to create a vision of careers, traditional and non-traditional, for all. As in other areas of the curriculum for girls there is a concerted joint effort of women in all strata of society, and with different capabilities, to link educational and personal needs of girls with the needs of the business world; thus broadening their life chances, facilitating career pathways and providing the adult world hopefully with a largely untapped reservoir of talent.

The Birth of Career Education for Girls in Australia:

This, undoubtedly, began with the superb quantitative analysis of education and career opportunities of women from (1939 to 1968) by Nance Cooper (1968).

Connell et al (1975) summarized boys' and girls' educational pathways in this way.

"The path through the higher years of school leads to something different for both sexes. For the boys it is a normal start to a career in business or a beginning for training in higher professions. For girls it will usually lead to marriage, but often after a stint in one of the semi-professions, nursing or teaching most commonly for which school graduation is required".

Four years later, there was a change in attitude by an enlightened few; "Care must be taken to see that girls do not, by subject choice, limit their career opportunities". (Hannon 1979:105 cited in Willey, R. (1984) Race, Equality and Schools).

In America, during the 1970's there was much valuable research into the history of American women, in their role of "submergence and subordination" and "the multiple, often mysterious devices, women invented to educate themselves".

"The female and family life are no longer seem as identical; career and family roles, it is finally recognized can be and are being combined" (Van Dusen & Sheldon 1976 cited in Green 1976:29).

"Now a new generation of women must make hard new choices to achieve full equality" (Greene 1976:25).

A number of programs designed to expand career options, such as those in the Hunter and La Trobe Valleys had considerable success (Sampson 1983).

Towns (1985) pleaded the case of lower achieving girls with their lack of qualifications to be able to enter a prestigious level of work in the trades in our technological age. She made a number of pertinent points:

- (1) Schools have an important part to play in ensuring girls have an adequate basic education in mathematics and science based subjects to enable girls to participate in the newly emerging technological occupations and thus to prevent further segregation of the workforce.
- (2) Urgent need for girls (themselves) to broaden their occupational horizons or be relegated to a life of intermittent employment, and/or involuntary domesticity (Towns 1985:40).
- (3) Encourage more girls to enter non-traditional work areas, but more importantly direct them to making well advised subject choices for these trades and apprenticeships. (D'Alpuget 1979 cited in Towns 1985).
- (4) Build up self confidence and assertiveness as an essential preparation for entering the traditional male trades and apprenticeships.
- (5) Develop links with employing bodies to facilitate girls' transition from school.

Concerns for Girls of Non-English Speaking Background: (Ref The Career Crunch)

Fowler (1982) discussed the incorporation of neighbourhood culture into the classroom. She noted that the "official culture of a group that is presented is often the male view and may be at variance with the hidden women's culture.

There were indications (Meade 1983, De Lacey & Poole 1979) that the "generally high aspirational help" by NESB parents for their children did not extend as strongly to their daughters as to their sons.

Butorac (1985) stated:

"Researchers (Isaacs 1981; Meade 1983; Knight 1977) have noted that NESB students are particularly in need of advice on subject and career choice. Their parents may be cut off from access to this information and be ill equipped to advise them. This is particularly important in relation to girls. These parents may have little information about the labour market, especially relating to changes in the role of men and women in society."

The action researchers in the Career Crunch Project in Western Australia in the early 1980's, believed that cultural factors should no longer be perceived as a deficit but as "variations that may make a positive contribution to widening the career choices of girls from NESB". The project was a collaborative effort of exploration and planning for action by teachers, parents and students - in developing ways of broadening girls' choices

Teachers were perceived "as action researchers" (Stenhouse 1975; Carr & Kemmis 1983). They were encouraged to explore their own settings which was informative and the basis of collaborative action with students, parents and teachers.

Briguglio (1985) found that these girls from NESB backgrounds had a healthy level of self esteem, but they needed achieving role models to develop higher career aspirations and confidence. She suggested that schools need to "do more in the area of informing girls but in a way that does not alienate them, because it seems to be another subject one does at school".

Other Individual Differences in Girls:

The work on career education of non English speaking families provides us with a valuable template for intervention. We need to look carefully at the special career needs of girls where social class, rural location, disability, Aboriginality and giftedness are inter-related variables.

Career Aspirations:

Research in Girls' Aspirations became a strong focus of attention in research connected with future careers. Concomitant to this research, girls in tertiary study and women already established in careers were targets of a parallel research line.

Girls' Aspirational Levels for Tertiary Education in 1970's (Ref: Girls, School and Society 1975).

Dufty (1972) found, in WA, higher proportions of girls from all types of schools entered teachers' colleges rather than university or WAIT. Boys from government schools entered WAIT and university. Boys from Catholic schools entered WAIT and boys from non-government schools entered university. When parental occupation was introduced the majority of girls still entered teachers' colleges, although daughters of the highest social class chose university courses (40% and fewer chose teachers' colleges than other groups). Meade (1971) too found similar educational aspirations, in New South Wales, with respect to the sector of post school education boys and girls wished to enter - where boys even repeated their final year at school to ensure university entrance. (Meade 1983)

In Summary:

CAES and Teachers Colleges	17% boys	39% girls
Technical Colleges	19% boys	22% girls
University	54% boys	34% girls

Mature age Women's Aspirations 1975:

In 1975 increasing numbers of women were returning to study (Girls, School and Society 1975 51-59), raising issues of access, child-care, preparatory courses, counselling and guidance, need for flexibility in timetabling, flexible course loads and location.

This scheme could be for women "the most important ingredient of real equality of opportunity between the sexes" Girls, School and Society (1975:58).

Lack of Role Models in School and the Education System and Girls' Career Aspirations:

Bradley (1979) and Hutchinson (1980) found that under representation of females in positions of power and authority in schools and education systems had a potentially inhibiting effect on girls' career aspirations. Cole (1981) outlined important strategies to overcome these problems (See also Career Development of Women Teachers pp 104-105 in this section).

Career Women's Aspirations:

Blackstone in her Fink Memorial Lecture (March 1987) noted that, despite high achievement at all levels of education, females' career aspirations and their progress within their chosen careers were very limited compared to males.

Beare (1987), also noted that the main obstacle to the maximization of girls' potential is not lack of educational opportunities so much as "entrenched stereotypes about jobs". Indeed the Year 11 and Year 12 subject choices of girls (1985-1989) for upper school TEE in Western Australia would appear to be an early manifestation of the problem identified by Blackstone and Beare (Parker & Offer 1987).

Girls' Aspirations:

Research by Parker and Offer (1987) on the "lower secondary school" achievements of girls and boys between 1972 and 1986 in Western Australia indicates that under the old Achievement Certificate

"where all students were exposed to approximately the same syllabuses for approximately the same amount of time" ... there was "equal science/maths achievement for boys and girls".

thus, the problem, it would appear concerns not girls' ability or achievements but girls' aspirations.

Career Education for Girls in a Technological Age:

"It is vitally important for girls to look closely at careers and their life long plans which may include traditional roles and not to foreclose on aspirations and expectations". Leder and Sampson (1989:34:35).

Creating Images of Equity Between Men and Women in Society:

Popular magazines now run articles, which are examples of media intervention in creating images of gender equity such as -

"Six glamorous careers with great earning potential. For women who want to love what they do and get paid what they're worth"
Cosmopolitan June pp 74-77.

Creating Images of Equity in Schools:

It is important that classrooms reflect 'androgynous' careers for men and women in each subject area by visual representation. I have observed Business Studies, Social Studies and Home Economics areas in schools in Western Australia with "gender equity" images on the walls.

Career Choice and Gender Differences:

"Factors leading to a career choice are complex but the results are straightforward" Baker (1989:99)

Baker 1989:99 reviewed a number of sex differences with regard to career choice:

- (1) Males aspire to higher levels of careers (Marini 1978; Salia 1982)
- (2) Express interest in a wider range of careers than do females (Currie 1982; Marini 1978).
- (3) Careers chosen by females are for the most part restricted to traditional areas, often teaching and nursing (regarded as an extension of the housewife/mother role) (Howe 1977; Marini and Greenberg 1978; Currie 1982).

Towns (1985) identified hairdressing as the almost sole choice of girls attending TAFE and apprenticeships and great resistance from male employers if they gained qualifications in non-traditional occupations.

- (4) Despite increases, females continue to be under represented in the sciences and attrition rates are higher than those of men (National Science Foundation 1982; de Laeter and Malone 1989; Newhouse 1989).

Traditional Conception of Women's Science Careers:

Standish (1982) identified 5 ways that women currently have careers in Science:

- o becoming an invaluable support worker
- o being a super male
- o marrying one's mentor
- o working in animate rather than inanimate science
- o forming a collective support group

Perceptions of the Characteristics of the 'would be' Women Scientist and non traditional career women in predominantly masculine domains; at the present time:

Baker (1989:99) identified four factors which influenced females in their choice of career; namely role-specific self concept in science; self perception in terms of stereotypical masculine and feminine characteristics; Logical ability and mathematics and science courses.

She found male students "believed that their behaviour in science class is more like that of the ideal science student, indicating that males have a better science role specific self concept than females".

In Mathematics, males intended taking higher level courses than females. Males performed better on an abstract logical thinking test (TOLT). However, female students intending to pursue a science career exhibited "the self confidence, ability and stereotypically masculine characteristics typical of Adult females in Science and other non-traditional careers". There was no difference in their self assessment of ability. (Baker 1989:103).

A New Conception of Engineers for the 1990's to aid development of educational experiences and career education for girls and boys for the 21st century

Newhouse (1989:91) identified desirable characteristics of Engineers for the 1990's and 21st century:

- o interested and capable in the mathematics and science areas,
- o enjoy logical thinking and systematic argument
- o have a practical bent
- o show imagination and curiosity
- o appreciate aesthetic beauty
- o like to work in a team
- o want to contribute to society.

Surely a balance of traditional male/female characteristics.

It is interesting to note that it is the female engineers (10%-35% of that student cohort) who win more than their proportionate share of prizes; receive more job offers than males on graduation; employers are pleased with their performance, graduate females report that they are encouraged and supported by management and workers. (Newhouse 1989:91)

'Engineering' Characteristics as a Long Term Goal of Education:

If the above characteristics are required for future careers in Mathematics, Science and Technology then teachers, administrators, parents, teacher educators and future employers need to work cooperatively to facilitate the development of desirable characteristics, both personal and academic, in all students. Students too should be empowered and made aware of cultural gendered expectations that inhibit such characteristics

and potential unfoldings in education, pursuit of careers and adult life in general.

The Present and Future Need that "Science and Technology" have for Girls and the Feminine Perspective:

"We need to work slowly, in an evolutionary way, towards a new, more humane vision of mathematics, science and technology and at the same time also work at breaking down unnecessary gender stereotypes in behaviour and career aspirations. A more revolutionary approach would I fear result in losses we can ill-afford of existing freedoms and of valuable female modes of thinking and behaviour". Issacson (1986:239).

Parker and Offer (1989:118) noted that whilst science is clearly important for girls and future careers, the "emphasis has shifted somewhat to examine the importance of girls (or the feminine perspective) to science". (See GASAT Conference Proceedings 1981, 1983, 1985, 1987).

Cross (1989:38) believes the "challenge is for science teachers to work for a science that has as its objective the creation of a sustainable world involving human beings in partnership".

Sjoberg (1989:36) found that people choosing technology are the "least person-oriented" of all the sub-groups he studied and often "end up with political power and great influence on the developments and priorities in future society". He perceives a great need for science educators to "recruit young people with a wider range of values and motivations" for technological careers - "more girls into technology may give this result". (Ref Kvande 1984 research). However, Sjoberg (1989:37) and Parker and Offer (1989:118) perceive that "free choice" in education often strengthens stereotyped sex roles and perpetuates erroneous and debilitating aspirations in girls. Sjoberg advocates "a common core curriculum and science for all" to promote sex equity. Research by Parker and Offer (1989:118-127) affirm how well lower school girls achieved in the common core curriculum in Western Australia between 1972-1986.

Illumination from Research aimed at College Students and "blocks" to their progress in Quantitative fields and Science:

Two American researches into students' choice of science majors and "quantitative fields of study in College illuminated the following:

- (1) Ware and Lee (1988:606) found concern for future family and personal life seemed to inhibit the choice of a science major for females, but facilitate science majoring for men.
- (2) Ethington and Wolfe (1989:165-69), basing their research on the pioneer work of Berryman (1983, 1985), believed we needed to get girls into the "quantitative" talent pool, through early intervention programmes in schools. Secondly, prevent later attrition from the talent pool by a better understanding of the "forces" limiting girls and women's opportunities and achievements. Finally consider the exacerbating variables of social class and black women - and the crucial re-education of parents.

A Philosophical Perspective on the Analysis of Freedom to "open girls' eyes to real freedom":

A philosophical analysis of freedom by Issacson (1986) in UK provided a valid perspective in overcoming cultural 'gendered' expectations of girls and future careers and that perhaps 'freedom' of choice paradoxically may mean compulsory mathematics and pure science; career education; 'awareness' workshops and 'shows' to develop awareness of the possibilities and wonders of science; and finally that broadened career horizons are only possible for girls with mathematics qualifications as the 'critical filter' for many prestigious careers and technological occupations. (Sells 1982).

Illumination from Career Paths of Women in Higher Education and Non-Traditional Careers:

There has been a strong research focus, especially in America, in the 1980's, affirming the effects of cultural gender expectations on women's life chances and chosen career paths. Garelick, writing in 1980, found that women pursuing scientific careers in higher education institutions confront discouraging patterns of training and unfair employment practices. Numerous studies and evaluations are outlined including: the US Senate's Women in Science and Technology Equal Opportunity Bill, a study by the Evaluation and Training Institute of Los Angeles, and a study by Jonathan Cole on women in the scientific community.

A paper from the Netherlands, in 1982, discussed the status of women in Dutch higher education. It alluded to Dutch attitudes towards women's roles and education; and the way lack of mathematics training in girls' elementary and secondary curricula, hinders women who want to pursue higher education and professional careers.

Maack (1986) examined roles of women in library education in three time periods: 1887-1923; 1924-1950; 1951-1985. Topics discussed include missionaries and mentors, library school founders, institutions offering graduate library schools, advanced degrees and publishing activity of women, women faculty, North American library school deans, and women presidents of library associations.

Shere (1987) studied the career development of women in Admissions. Most women working in universities, especially public schools, occupy lower status positions. Women have the qualifications to succeed as directors of admission, but affirmative action has not increased their numbers, and those who are directors earn 80 percent of what their male counterparts make. She discussed the role of women's advancement programs to empower women.

These results have illuminated valid causes for concern for girls and women and a need for intervention projects and strategies to counter and positively reverse factors exacerbated by cultural 'gendered' expectations. It is the aim of people concerned with girls' education to create career paths that allow girls to pursue their chosen careers "with the least possible suffering" (Cooper 1968) and to contribute their "valuable modes of thinking and behaviour" (Issacson 1986; Parker & Offer 1989) and preferred "person-oriented cognitive style" to science, engineering and technology (Sjoberg 1989; Cross 1989; Newhouse 1989).

Cross (1989:41-42) recounts the difficulties and dangers of women scientists campaigning for science to be "consciously organized for human betterment" during the 1960's and 1970's.

CAREER EDUCATION FOR GIRLS - INITIATIVES - Pre-school Vocational Training

Technology for Girls starts at nursery school in Sweden. Granstam (1986) suggests practical activities which can be introduced into the training of Swedish nursery school and compulsory school teachers for the purpose of improving the organization of technology classes. She explains how simple inexpensive materials can be used in imaginative ways to intrigue and involve children, especially girls, in technical activities. (Granstam 1986).

Awareness of Careers Starts in Pre-school:

A colouring book produced by Martin (1986) is intended to provide children in child care programmes, with activities that reinforce the many options for vocational careers that are available to all persons regardless of sex, race, or disability. The book contains pictures of persons of both sexes and various races as well as individuals with disabilities. Each picture deals with one of the following occupations; child care worker, homemaker, horticulturist, carpenter, cook, dental assistant, practical nurse, auto mechanic, cashier, secretary, drafting assistant, and electronic technician.

A teacher's guide accompanies each activity sheet with information and suggestions for helping students use the colouring page effectively. Each guidesheet includes the following information about the vocation, vocabulary associated with the picture, details included in the picture, a suggested pre-activity for the child (including objects for play), suggestions for having a visitor to the child care center, and suggested field trip and extension activities.

Primary School Career Education:

Dianna (1984) discusses the value of using children's books to enhance career education and presents sample learning activities for use in presenting career education concepts through literature. It is a most comprehensive teaching guide.

High School Students' Inclusive Career Education - Whole School Approach:

The Pennsylvania State Education Department, in 1986, produced a packet of materials for a three day non traditional career awareness unit. The unit was tested and evaluated by over 10,000 students, counsellors and educators. Its purpose was to make students more aware of the full range of career opportunities open to male and female students.

Social Science: Vocational, Law-related and Affirmative Action emphasis

In the USA, law-related education with a vocational emphasis has developed throughout the eighties. Simms (1980) examined the responses of social studies to racism and sexism in the 1960's and 1970's. He saw institutional racism and sexism as root causes of social issues and strongly believed that teacher education, curriculum offerings, educational practices and policies must be revised to counter this reality.

Curriculum development in law-related education was in evidence in 1984 when, Dudley-Smith, et al (1984) produced a series of social studies units and activities for achieving sex equity and fostering non-traditional career orientation among elementary students (K-6).

Tabor, J.L., (1986) produced ten role playing scenarios which involved Junior and Senior high school students in appreciating the social milieu of a time "when women did not have the vote".

Malcolm, (1985a,b) developed the Project Equity curriculum guide to heighten student awareness of sex equity issues, teaching equal treatment for both sexes and to equip students for legal remedies. Experiences are graded in increasing cognitive competence of Grade 6, 7 and 8 students. She produced an accompanying training module for teachers and administrators involved in Project Equity. It subtly introduced the need for equity in all aspects of the curriculum and projects to enhance classroom, school and community involvement.

Cancellier, P.H. and Crews, K. (1986) produced a learning module to help to raise student awareness of the important issues from the U.N. Decade for Women.

Giese, J. and Miller, B. (1987) introduced a lesson in law-related education, to help students understand affirmative action redressing former discrimination and fairness to others.

Middleton (1987) in a unit reviewed United States Supreme Court decisions regarding racial and sexual discrimination which encourages individuals to make evaluations on fairness of decisions made. Social Studies, then, can play an important role in changing student attitudes towards equity for all people and the laws that help effect justice.

Engineering Careers for Girls - The Role of Science Teachers:

Teachers of upper school science are strategically placed to influence students in their career choices - including engineering as a career for both girls and boys. "Good brains are needed to come up with clean energy efficient and environmentally gentle designs especially now that planet earth is facing massive environmental problems". (Newhouse CK 1989:91).

Science teachers should have an important career counselling role and be clearly aware that careers in any engineering field require initial qualifications in mathematics and science, where mathematics includes calculus, and physics and chemistry are studied specifically.

Awareness-raising of Girls that Mathematics is a "Critical Filter" in determining whether an individual can go along many training and career paths:

(Sells 1982 cited in Issacson 1986:224)

- (1) One day conferences - "Be a Sumbody" 1985 hosted by Avery Hill College and GAMMA in UK. "Aimed to convey a "girl-friendly" message about the nature of mathematical activity and to reinforce the narrowing effect on career prospects of disengaging from school mathematics" (Burton and Townshend (1986:189).

2. Linking Science and Careers with COMETS:
Mullins-Gunst and Simonelli (1989:83) discuss the way the Career Oriented Modules to Explore Topics in Science (COMETS) project encourages all students, but especially girls, to consider science related careers; perceive how useful a study of science is, in a whole range of careers and to continue to study science to increase life chances. The strength of the project is the use of role models, live, historical and contemporary.
3. Technical Skills for Girls (Groves 1989:85)
An initiative of the Department of Labour in Victoria is a pilot programme aimed at finding successful ways of increasing the number of girls choosing careers in science and technology. It involves an incentive grant in mathematics and science, technical work experience and career counselling.
4. Women's Studies in Schools. Yates (1986) has opened the debate about introducing Women's Studies as a legitimate school subject, to create students awareness for widening future life chances and empowering them to make wise choices.

Facilitating Career Paths of Tertiary Women Students:

Barnes (1989:105-117) reports on a "Rescue Operation" at the University of Sydney to assist "at risk people, mainly women, who do not have a firm grasp of Mathematics that they need for their courses". (p105).

Meikle (1989:87) describes the support given to women engineering students - through the "Women in Engineering Project". At the University of Melbourne enrolments for women have increased to 17% in 1st year, and significantly the female drop out rate is lower than males.

Career Education and Focus on the Professional Development of Administrators and Teachers in the School Situation:

Communication Skills between men and women:

Girls and Sexuality (Holly (ed) (1989) explores some of the issues concerning sexuality and schools from the perspective of girls and women and maintains that schools are implicated in maintaining oppressive sexual attitudes. How women's sexuality is reflected by and in the school concerns silence, embarrassment and sexual harassment.

Remedy:

Social Skills Learning - a way to alleviate communication problems. Scott (1986) focuses on social skills in which there is a disparity between male and female performance, including leadership, self-confidence, emotional sensitivity, empathy, and prosocial behaviours. This is so important in breaking down the sex stereotype barriers of communication at the leadership level in schools. Guide-lines are also offered to these educators who in turn help their students to learn sex equitable social skills to overcome sex bias.

Teachers' Assessment of Students for Future Careers and Self Assessment on Equity Issues:

Kearns (1989:61-64) evaluates the ILEA Profile and London Record of Achievement Scheme aimed at enabling students to become intrinsically involved in their own self assessment. Gender stereotyping is still inherent in developing such profiles - however, used productively, these profiles should provide a tool with which teachers can monitor their own work on assessment in terms of its implications for equity. A subtle form of Professional development for teachers.

Teachers' encouragement and positive feelings effects on Science Career Decisions:

Matyas' (1984) study of exceptional biology teachers identified two major factors for encouraging female students to keep on the "science track":

- (1) Habit of enrolling his/her female students in further science and mathematics courses.
- (2) Found best predictor of Science Career interests for girls was "positive feelings about their science classes".

"Guidance Personnel" Training for Career Guidance for Women and Girls:

"Career counselling reform is needed to avoid course and career segregation and stereotyping" (Sadkar and Sadkar 1988).

Women and Girls' Career Education - USA Initiatives:

Birk and Colby (1985) produced a learning module, part of a competency based guidance programme, which focussed on professional and para professional personnel, who will be providing career guidance for women in the USA.

Girls and Women in Rural Areas:

A resource kit was developed at the West Alabama Curriculum and Materials Resource Centre, in 1984 for counsellors as a vehicle for addressing the needs of females in rural areas. The field tested kit examines counsellors' attitudes, resources and techniques and suggests strategies for counteracting sexism in counselling programs. The kit addresses the specific needs and limitations characterizing rural areas; inaccessibility of area library facilities to research issues related to women's equity, lack of information on nonsexist resources, insufficient funds to purchase resources and dual responsibilities of counsellors.

The counsellors are provided with guides to set up a "curriculum resource centre" and "a model sex fair counselling programme for junior and senior high school students".

Counsellor Communication Skills:

Mattox and Hunt (1987) focussed on listening skills of counsellors. The workshops included:

- discussion on how misinterpretation affects relationships, early learning and its effects on listening and gender differences in listening.
- a consideration of differences in how people send out messages auditorally, visually and kinaesthetically, and,
- finally taking all these factors in consideration participants developed "listening as a skill" in effective communication.

Patterson and McCubbin (1987), concerned with gender differences in adolescent coping behaviours developed a self report coping inventory "The Adolescent Coping Orientation for Problem Experiences".

Kelly and Eubanks (1988) in Today's Teens focus on "Why are you exploring careers?" in chapter 6. A useful book indeed.

Le Souef (1990) has developed a new computer based 'Career Mate Programme' at Willetton Senior High School with a comprehensive list of questions for students to answer related to personality, interests and abilities. "Career choice is nothing less than the the last vital step in the whole career process".

Conclusion:

Guidance Officers need to be alerted to the special needs of adolescent girls and may require special inservicing to meet the career and personality needs of girls in the 1990's, as they are encouraged and supported along career paths in an age of technology.

Career Education and the Focus on Parenting, Parenting Education and Community Education

1. Parents' Level of Concern for Girls' Careers:

"Girls receive considerably less parental guidance, interests and pressure with regard to career preparation than do boys" (Dillon 1983 cited in Towns, 1985:114).

2. Effects of Parental Attitudes on Girls' Assessment of Suitable Careers:.

"Girls assign a much lower status and importance to technical occupations due to the negative attitudes held by parents with regard to these as suitable occupations for girls". (Towns 1985).

3. Parenting Education in the USA, UK and Australia

Scott Jones et al (1986) in the US examines sex equity and related issues in parenting and parent education. Strategies for encouraging sex equity were proposed.

4. Focus on 'Maths' as a Family Business:

Vasey (1989) describes and evaluates the Family Maths Project in the ACT which aims to bring parents, schools and community together in educational partnership to improve understanding of mathematics and to ensure all children (girls and boys) acquire mathematically

related skills and knowledge to meet the demands of employment and technology. It aims to improve confidence and attitudes towards maths by making maths an enjoyable and cooperative experience.

The project involves two components: a preparatory inservice programme for parents and teachers and in-school programmes for families in their own community. The FAMPA project complements several PEP initiatives in the ACT. Parents become resource people, make use of maths libraries and often change their own attitudes to mathematics, especially mothers, which has a most positive spin off for their daughters. (Vasey 1989:103).

5. GAMAST Professional Development Manual:

Collated by Lewis and Davies for CDC (1988) and aimed at promoting Gender Equity in Mathematics and Science is intended for Group Study, of which interested parents may be a part, along with Counsellors, Administrators, Teachers and Students.

6. Whatever Happens to Little Women - Gender and Primary Education (Skelton (Ed) 1989).

Views gender stereotyping from the perspectives of parents, children and teachers and examines a number of strategies which have been adopted to combat discrimination within primary education in UK.

7. Bringing Science to the Community : The Wisenet Science Shop (Women in Science Enquiry Network Inc).

Rainworth (1989:88) reports on a new agency in Canberra whose aim is to help individuals and community groups with problems in the natural and social sciences. The Network helps empower community groups and enhances communication and understanding between specialists and community.

Evaluation of Career Counselling and Educational Interventional Programs for the Gender Equity:

Quantitative Evaluation:

Rowell (1985) concluded that multidimensional scaling is useful in producing interpretable valid representations of mental structures. In this case of gender related changes in response to educational programs and career counselling.

Qualitative Evaluation and Intervention Programmes:

O'Donnell (1984) analysed the relationship between women, work and education and included teachers in the analysis.

Whyte (1986) provides a full evaluation of the GIST action research project and its benefits and limitations are expressed in the Appendix of her book.

Chisholm and Holland (1987) in their curriculum development project focussed on anti-sexism and girls' occupational choices.

CAREER DEVELOPMENT OF WOMEN TEACHERS:

Since girls have so few female role models in positions of power and authority in the school, a parallel "curriculum" to that of girls is the professional and career development of women teachers.

Evans (1984) discussed gender differentiation in the Australian primary school classroom as a reflection of both the occupational structure of primary school teaching and of teachers' perceptions of their careers. She researched into differences in interpretations of personal careers for men and women teachers. ... "and the taken for granted gender assumptions of school and classroom life".

Schwager (1987) surveys the literature on the history of coeducation in America, focussing on the marginalization of women. She discusses themes including republican education, female literacy, the girls' academy, women and the history of teaching, life cycle patterns, the migration of teachers from New England, black women teachers, urbanization and feminization, immigration, coeducational college students, women's institutions, women academics and research, and new directions.

De Lyon and Widdowson Migniuolo (1989) have edited a collection of papers related to Women Teachers which concentrate on identifying how inequality is reinforced by structures and attitudes within the education system, ways of challenging this situation and the importance of promoting the status of women as teaching professionals. It is a book every enlightened educator should read.

One paper by Leonard (1989:23-36) concentrates on Gender and the importance of initial teacher training for all students. "The single most effective way to counter sexism in education would be through teacher education" (Whyld 1983:309) to ensure that "students are alerted to preconceptions based on race and sex, but also know how these manifest themselves in resource allocation, in school and classroom organization, in the overt and hidden curriculum, in the playground and in careers advise" (Wormald 1985:115).

Leonard (1989:28) provides suggestions on the way lecturers in teacher education, based on the ideas of Shakeshaft (1986), can provide student teachers "with a background of support and tactics to take a critical perspective on the curriculum" for gender equity and to cope with the conflict they may encounter with administration.

The McClintock Collective in Victoria is a vital support for female science teachers and may be extended to teachers involved in technology and career education (in Leder & Sampson 1989:138).

FOOD FOR THOUGHT

A word of caution from UK, so that girls' career issues are not masked by a general concern for vocational education.

In Changing Perspectives on Gender: New Initiatives in Secondary Education: (Burchell & Millman 1989) is a particularly interesting article by Weiner (1989:121) "Feminism, Equal Opportunities and Vocationalism" where she asks three pertinent questions:

"Is there any difference between the "liberal" approach to equal opportunities of vocational policy makers and that of feminist teachers advocating "girl-friendly" schooling?"

"Can feminists draw on earlier gender initiatives to give equality a higher priority in the new government schemes and to implement more effective strategies for change?"

"Can feminists create a new power base in new education programmes?"

Initiatives in Australia - Keeping the Gender Issue alive in Career Education.

Though Australian education has a strong vocational and "education as an investment emphasis" for all, there are some strong links with employers developing and networks of women in science.

CSIRO women are involved in a Science Project which is aimed in the long term to "encouraging girls at every level to seek employment in the science field and to encourage women to take up science positions where they can have an influence on science, such as developing a more cooperative approach and emphasising the social concerns of science research" (Kingsland 1989:45).

The McClintock Collective in Victoria, is a network of science teachers "actively involved in promoting science education that is relevant to and inclusive of girls and women" (Leder & Sampson 1989:128). They are currently concerned with becoming involved in 'Technology Education' and 'Career Education' so that "due account of girls' needs will be considered from the start" (1989:138).

CONCLUSION:

As with other aspects of the curriculum for girls we need to monitor every aspect of career education for girls to ensure gender equity, especially in terms of equitable outcomes for girls. (ref Print 1988) Clearly quantitative statistics in enrolment in mathematics, science and technology, in TEE examinations entered, and qualitative achievements are important. However, it appears that girls being "person-centred" are very much affected by the expectations, aspirations, encouragement and positive feelings towards them, by adults who care for them and teach them - It is imperative that we monitor these through our interactions with students, the "classrooms of equity" we create; and the career images we display personally, visually and verbally in our resources. Our communication patterns as adults should also be monitored for gender bias, prejudice and racism.

The quality of our collaborative work as teachers, parents, counsellors, employers, and administrators should also be monitored (Evans 1989:73-83; Vasey 1989:98). Products (girls and boys) of the system may be compared with the "ideal" for the new technological and scientific age. (Newhouse 1989:91)

Finally, research and innovations in Europe, America, UK and Australia collectively show that to create career pathways for girls in a technological age, there still needs to be a concerted focus on the invidious effects of sex role stereotypes and clearer perceptions of the

shared responsibility for family, work and self-fulfillment of men and women.

Perhaps these roles will be shared totally or negotiated in the 21st century. We need to break down attitudes which jeopardize the expansion of life chances of girls to become productive and creative members of society. A key start in education is to break down the strong masculine stereotyping of subjects such as Maths, Science, Computing and Technology, that are key filters to many occupations (certainly "humanizing" them with a feminine perspective).

We need, as the action research suggests, to provide adults (counsellors, administrators, teachers, parents and employers) with "re-education" or "initial education" courses, to enable them to assist young people, particularly girls, with career choices. The issue remains with regard to future parenting and the joint responsibility of men and women.

Note 1, the Availability of Early Childhood Studies for Year 11 and Year 12 in WA.

Note 2, An Innovative Personnel Development Program for Boys in the ACT coordinated by John Dunn and a similar program developed for girls, by Gender Equity Consultant, Joan Dunn.

Post Script, Paternity leave granted to Fathers in Australia, 26 July 1990 - has implications for education of boys in parenting.

CAREER EDUCATION FOR GIRLS - RECOMMENDATIONS

It is recommended that educators, teachers, counsellors, administrators, parents, community members, employers, student teachers and students:

- o perceive the need to link the economic, scientific and technological needs of society with the education of girls
- o recognize that 'career education' is an absolutely crucial programme for girls, both in the formal classroom, periodic intervention programmes and sound counselling especially in secondary school.
- o receive formal education/training in the education of girls, especially teachers in pre-service Education Programmes.
- o enable girls to make wise choices to achieve fully equity in their schooling and future careers by:
 - broadening their horizons
 - tracking girls into 'compulsory mathematics, science and technology' as critical filters to prestigious careers and occupations to allow them to make freer choices in careers and expand their life chances.
 - encouraging girls to enter non-traditional work areas
 - developing links with employing bodies to facilitate transfer from school to work

- building confidence and assertiveness particularly if entering non-traditional careers and occupations.
- establishing remedial and support programmes in mathematics at secondary and tertiary levels for girls and women.
- o familiarize themselves with the research on the aspirational levels of girls and women, particularly that low aspirations are a key factor in career choice not lack of ability.
- o carefully consider that girls have few role models of women in high status careers in school, tertiary institutions and industry, which clearly affects their own career aspirations.
- o collaboratively explore and plan for action and implement career education for girls, where parents, teachers and students develop ways of broadening girls' choices.
- o consider the added difficulties of girls' career choices due to ethnicity and parental aspirations of girls.
- o consider other variables that are inter-related with gender such as social class, rural location, Aboriginality, disability and giftedness which have a bearing on particular careers and life chances of girls.
- o are cognizant of the media's role in creating images of equity between men and women
- o ensure that visual images in the school and classroom reflect the changing roles and careers of men and women in a technological society, particularly in non-traditional subjects.
- o develop an awareness that factors leading to career choice are complex and familiarize themselves with the research findings.
- o develop accurate conceptions of the women scientist and non-traditional career woman in the present and future contexts of science and technology.
- o in order to design educational experiences and create career pathways for the 21st century, look at profiles of achieving people, especially women in non-traditional occupations and careers.
- o given the ideal, study the ways in which girls and women are limited in the achievement of qualifications, particularly in "quantitative" fields of science, mathematics and technology.
- o implement intervention projects and strategies to counter and positively reverse factors exacerbated by cultural gendered expectations.
- o ensure that valuable modes of thinking and behaviour of girls, and preferred "person-oriented" cognitive style be fostered so that science and technology "may be consciously organized for the betterment of human kind".

- o are aware that career education for girls and boys begins in pre-school; is enhanced through literature and social studies in primary school and secondary school; through encouragement and sound advice especially by 'masculine oriented subject' teachers, in science, mathematics, computing and technology in high school; and linking with future employers.
- o ensure all, especially girls, realize that mathematics is the "critical filter" for many training and career paths for our technological age.
- o provide support for women and girls throughout their careers.
- o men and women improve communication skills in educational institutions and amongst boys and girls.
- o check any final assessments made of girls for gender bias due to cultural gender expectations of the assessor.
- o perceive the need for teachers to consciously encourage girls to keep on the mathematics and science track and recognize that science career interests of girls are strongly related to "positive feelings about their science classes"
- o consider the need for special guidance personnel training for career guidance for women and girls and study the initiatives from the USA.
- o value parenting education as an important aspect of career education for girls and boys with consideration for recent implementations in UK, USA and Australia in the context of West Australian Schools.
- o consider the career development of women teachers and educators as a matter of urgent concern for their own career paths, personal advancement, becoming good role models for girls in school; and changing perceptions of a male dominated power structure in the schools and the institution of education.
- o carefully monitor all aspects of career education for girls in terms of outcomes of equity and the products compared with the "Ideal" for Science, Technology and "Future" careers.

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