Revisiting and deconstructing research into gender and science education in Australia: a description of work in progress.

Part I

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Abstract
It is only during the past twenty years that the education of girls has become an issue of concern in Australia. The Women's Liberation Movement of the sixties combined with the election in 1972 of the Whitlam Labor government (after twenty three years of conservative leadership at the national level) contributed to an increasing focus on the education of girls. Since that time, the original focus on girls' education has broadened into a field which also encompasses gender equity issues related to boys. A number of sites of production of discourse can be identified within this field. Some of the texts which constitute these discourses include gender and education policy, gender equity reform strategies, gender related academic research and journalistic reporting.

The research proposal outlined in this paper specifically focuses on discourses within the field of gender and education related to science education. Since the early seventies, concern over girls' participation and achievement in science subjects, as well as the masculine nature of science have provided the impetus for numerous research projects, reform strategies and policy initiatives. Despite this attention, it is questionable whether girls' outcomes from science education, and indeed from education in general, have changed dramatically in this time. Even so, the recent resurgence of interest in boys' educational needs is frequently justified by claims that girls' education strategies, particularly in non-traditional subject areas such as science have been successful.

This paper outlines a proposal for research that aims to show how such claims can arise out of the discursive practices of the field of gender and science education. For example, an attempt will be made to identify how the field is constituted and organised through various discourses such as policy, reform, research and journalism. Important questions to be considered include: who contributed to the development of these discourses?; why were certain issues taken up, researched and given funding priority?; whose interests were served through the discursive practices that developed?

The major potential contribution of the research proposed in this paper is a deeper understanding of the nature of knowledge produced within the field of gender and science education. Understanding how knowledge is constructed through the discursive practices of gender equity
discourses, reveals for example what questions, reforms and policies are ruled out, or considered invalid, as well as those that are pursued. This approach also allows the gaps and absences in knowledge to become more visible thus facilitating more powerful interventions and more effective processes for conducting the agenda of gender equity reform.

Background
It is only during the past twenty years that the education of girls has become an issue of concern in Australia. The Women's Liberation Movement of the sixties combined with the election in 1972 of the Whitlam Labor government (after twenty three years of conservative leadership at the national level) contributed to an increasing focus on the education of girls. For example, soon after its election Labor initiated a report into schools and inequality (the Karmel report). Although this report made only brief mention of the educational disadvantages faced by girls, the following year the newly established Schools Commission initiated a more extensive inquiry focussed on girls. This inquiry resulted in the publication two years later of Girls, School and Society (Schools Commission, 1975). In the following years, each State and Territory developed its own policy aimed at promoting equal opportunity in education. A focus on girls educational outcomes remained a priority area throughout the eighties and culminated in the first national policy in the area of schooling titled The National Policy for the Education of Girls (Commonwealth Schools Commission, 1987).

The Federal, State and Territory negotiations which led to the development of this landmark policy are discussed in Kenway (1990) and Yates (1993) and The National Policy for the Education of Girls (Commonwealth Schools Commission, 1987), of particular interest to the present discussion is the contribution of this process of policy formulation to the development of the field of gender and education. This study treats policy formulation as a site of production of gender and education discourse. Other sites to be considered include school based reform efforts, academic research and journalistic reporting. This study specifically focuses on discourses within the field of gender and education related to science education. Since the early seventies, concern over girls' participation and achievement in science subjects, as well as the masculine nature of science have provided the impetus for numerous research projects, reform strategies and policy initiatives. Despite this attention, it is questionable whether girls' outcomes from science education, and indeed from education in general, have changed dramatically in this time. Even so, the recent resurgence of interest in boys' educational needs is frequently justified by claims that girls' education strategies, particularly in non-traditional subject areas such as science have been successful. This paper outlines a proposal for research which aims to show how such claims can arise out of the discursive practices of the field of gender
and science education. For example, an attempt will be made to identify how the field is constituted and organised through various discourses such as policy, reform, research and journalism. Important questions to be considered included: Who contributed to the development of these discourses?; Why were certain issues taken up, researched and given funding priority?; and Whose interests were served through the discursive practices that developed?

The major potential contribution of research proposed in this paper is a deeper understanding of the nature of knowledge produced within the field of gender and science education. Understanding how knowledge has been constructed through the discursive practices of gender equity discourses, helps reveal for example, what questions, reforms and policies are ruled out or considered invalid as well as those that are pursued. This approach also allows the gaps and absences in knowledge to become more visible thus facilitating more powerful interventions and more effective processes for conducting the agenda of gender equity reform.

Approach
Previous studies have mapped the field of gender and education in terms of the topics of research and disciplines out of which research has emerged (Yates, 1987); summarised the findings of research (Commission, 1984; Morgan, 1986); and outlined the context of research in Australia as a way of drawing comparisons with similar research overseas (Sampson, 1990). The approach adopted in the current study will draw on Foucault's approach to the “analysis of the history of discourses” (Bove, 1988), or the “descent (Herkunft) of practices as a series of events” (Flynn, 1994) as reflected in his genealogical studies such as Discipline and Punish (1975). This project involves more than a chronological retelling of the development of ideas, rather it will attempt to reveal how discourses within the field of gender and science education “constitute and organise an entire field of knowledge ... discipline the judgment, and thereby response, of students and teachers; and, in so doing, [reveal] links to forms of power--such as teaching--that have effects upon the actions of others (Bove, 1988, p. 51)

As Flynn (1994) explains, “Genealogy seeks out discontinuity's where others found continuous development. It finds recurrences and play where others found progress and seriousness...The methodological point (to be spelled out in Foucault's detailed analyses) is that, when viewed from the right distance and with the right vision, there is profound visibility to everything” (Flynn, 1994)

It is hoped that a genealogical approach will help to reveal how claims, or “truths” that presently constitute knowledge in the field of gender and science education are constructed through the discursive practices that regulate and organise this field. Or in other words, need to be considered relative to the field of research into gender and science education, are functions of this frame of reference and
“constitute” the truths they claim to discover and transmit (Bove, 1988)

The act of dividing the field into sites of production, itself reflects a process of knowledge production (or knowledge deconstruction) that raises certain voices or positions, whilst at the same time silencing others. This is illustrated in the choice of the combination of words used to describe the “field of research into gender and science education”. The use of the term “gender” rather than “girls”, reflects a position which focuses on how gender is constructed, rather than on problematising girls or problematising boys by applying normative methods of comparison, or by focussing on individuals through socialisation accounts of differences. Instead, the concept of gender construction opens the possibility of examining girls and boys multiple subjectivities in education.

The use of the term“ gender” should not be taken as an indication that issues related to girls and boys in education are similar. On the contrary, equity issues related to girls include widespread, possibly endemic, sexual harassment such as that reported in Listening to Girls (Milligan & Thomson, 1992) and reduced post-school options of girls compared to boys. Whereas, equity issues related to boys include claims that boys have fewer communication skills, lack initiative, avoid being perceived as academic and record higher levels of levels of imprisonment and suicide compared to girls.

Research questions

This study will attempt to reveal ways in which sites of production such as gender and education policy, gender equity reform strategies, gender related academic research and journalistic reporting have constituted and organised the field of gender and science education.

An initial reading of the field of gender and science education indicates limited dialogue between discourses produced in different sites. For example, research reported within academic texts appears to have had limited influence on the development of Government policy. Typically, task forces and review committees that have been appointed to investigate specific questions and make recommendations leading to policy formulation adopt research methods that have frequently by-passed research reported in academic texts. Instead they rely upon information gathered through departmental channels, anecdotal evidence gained through submissions and school visits. This is not to suggest that these methods are inferior or necessarily vastly different to those used in research reported in academic texts but that the task forces and review committees have not heavily drawn upon academic texts in informing their arguments or substantiating their claims. Connell (1992) refers to such methods of research as QAD (quick-and-dirty-research). Despite the pejorative implicit in this description, Connell claims that such research “is a knowledge production process organised on different institutional bases and from
a different point of view [to positivist educational science]. The research can be perfectly ‘good’ with respect to the institutional practice in which it is used” (Connell, 1992, p. 5)

This study will attempt to show how discourses within the field of gender and science education have co-opted, incorporated and possibly subsequently abandoned discourses drawn from other fields such as feminism, psychology and sociology.

Although school based gender equity reform efforts have since their inception been strongly influenced by liberal and radical feminist frameworks, it is only more recently that feminist frameworks have begun to inform the academic literature in education. Initially it was dominated by attempts to identify sex-related differences in achievement and participation, particularly in subjects such as maths and science. Biological frameworks that were initially used to explain these differences gave way to the application of sex-role socialisation theory before feminist frameworks began to exert an influence on this type of research. Most recently, feminist post-structuralist theorists have contributed to the formulation of questions and analyses.

This study will attempt to locate the function and effects of some of the major discourses within the field of gender and science education.

In recent years there has been an increasing re-focus on boys educational needs in response to claims (particularly in the media) that gender equity reforms aimed at improving girls educational outcomes have been successful. For example, the Report of the Committee of Review of New South Wales Schools (NSW Ministry for Education and Youth Affairs, 1989) states that the “emphasis for the future should be on equal educational opportunity for both girls and boys, offered free of gender preference or bias”. In support of this argument, the report claims that “sexism in education has been heavily reduced” and that “improved educational opportunities for girls have been appreciable” (NSW Ministry for Education and Youth Affairs, 1989: 256 - 257).

However, findings of reports such as Listening to Girls, the title of the first review of the National Policy for the Education of Girls (AEC, 1986) strongly question such claims. Listening to Girls reports on the experiences of over 800 school age girls and concludes that girls still experience educational disadvantage in schools, it claims include that:

•“Girls suffer sex-based harassment in co-educational classrooms and school yards that contribute to passivity, restricts access to space, equipment and attention, undermines feelings of safety and self-worth and reduces risk-taking behaviour.” (p. 57)
•“Some of the most common teaching practices are less effective for girls than boys.” (p. 57)
•“Girls' participation in the curriculum is still stereotyped. They are under-represented in mathematics, science, technology and physical activities and hence leave school with fewer skills and competencies in
these areas.” (p. 57)

• “Girls' expectations for their post-school careers reinforce the existing patterns of gender-segregation in the Australian labour market, in post-compulsory education and training systems, and in the domestic sphere.” (p. 58)

• “Girls’ messages about their needs are not listened to sufficiently by scholars and teachers.” (p. 58)

The experiences of the 800 girls reported in Listening to Girls would appear to present a strong challenge to claims that policies related to girls' education have been successful. However, looking in schools for signs of successful policy implementation may be inappropriate if these policies had little to do with changing what happens in schools. Ladwig, (1994) suggests that the effectiveness of policy making is best understood strictly with respect to its role in the field of educational policy rather than questioning the effectiveness of policy in terms of how policies are implemented. Ladwig's study highlights the need to identify the function and effects of educational discourses before seeking evidence of their success or failure.

In a recent study, Jane Kenway (1993) has begun to explore this question as it relates to gender equity reform. She has identified four primary discourses in school based gender equity reform, namely: (1) changing choices; (2) changing girls; (3) changing the curriculum; (4) changing the learning environment. Kenway's research confirms that gender equity reform strategies have explicitly attempted to facilitate and promote gender equity in education by changing girls, the curriculum and the learning environment. It would therefore be consistent with Ladwig's (1994) position to seek evidence of successful implementation of gender equity strategies within girls, the curriculum and the learning environment. However, the type of analysis Kenway has applied to reform efforts has not been extensively applied to other sites of production within the gender and education discourse and their functions and effects remain essentially unexplored.

Beginnings

Rather than a conclusion, I will “end” this paper with a description of beginnings. Described above is the current state of my doctoral research proposal. I suspect that it will change and evolve many times yet before it is completed. I have felt hesitant about presenting a “proposal” for research feeling instead the need to present “findings” of research. This possibly reflects my ongoing struggle with issues of exclusion from academic discourse, it may also simply reflect a feeling of being under-prepared that seems to have been echoed by most other conference participants that I have spoken to.

The influence of Foucault on my thinking can most definitely be linked to my supervisor and other academics within my school at the University of Newcastle. However, I do not wish to jettison all sense of personal agency, or resort to socialisation theories to explain why I am heading down a certain path of thinking. Poststructuralist notions of multiple subjectivities and discursive practices have to date, been the most
powerful tools I have encountered in my attempts to seek theoretical underpinnings to my experiences as a student, teacher and teacher educator of science, particularly physics. During the next twelve months I will be spending a semester at the University of Wisconsin at Madison. I anticipate that the above proposal will be as transformed by this experience as I expect to be, I hope to report on my progress at the next AARE conference.

Bibliography
