

# A Rationale for Employing Mixed Methods Design in Doctoral Research about Female Students' Academic Achievement in Secondary Schools in Papua New Guinea

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## Abstract

Contextual features and research problems are among some of the important factors that must be considered in making decisions about the most appropriate research design to employ in designing and undertaking doctoral research. In my doctoral research project, I was significantly influenced by a number of such issues in determining an appropriate research design. As the study focused on a problem confronting an under-represented group – female students – in a unique and complex context, mixed methods research design informed by the pragmatic and transformative-emancipatory theoretical positions (Creswell & Plano-Clark, 2007; Mertens, 2005a; Tashakkorri & Teddlie, 2003) was considered as providing the most appropriate design for my doctoral research project.

Mixed methods research as a methodology was considered for its direct engagement in the complexity encountered by researchers in culturally diverse communities when work is focused on a social justice agenda (Creswell & Plano-Clark, 2007; Mertens, 2005a). It was also identified as embracing three underlying issues which were important to this study. These were: a focus on research outcomes through emphasis on the importance of the questions asked rather than the methods of data collection; a need to collect different voices from those living the experiences with an intention for advocacy; and a dedication to promoting social change as an outcome of the research.

As a research design, mixed methods research was considered for its ability to incorporate both quantitative and qualitative data collection techniques. Thus two highly structured numerical survey questionnaires for data collection and analysis were used with a larger sample (de Vaus, 1995; Johnson & Christensen, 2004). Additionally, two sets of interview schedules and focus group schedules were used for data collection and analysis with smaller samples. These were set up for refinement, extension and explanation of specific quantitative findings such as statistical relationships and differences among groups, or unexpected results in the participants' own words (Creswell, 2002; Krueger, 2000; Silverman, 2006).

## Introduction

The research methodology and design employed in my doctoral research were used to accommodate the uniqueness of the sociocultural context, the geographical nature of the country in which the study was conducted and the research phenomenon under examination. Participants representing speakers of some of Papua New Guinea's more

than 860 distinct languages, diverse ethnic cultures and geographical locations were drawn from two contrasting research sites, labelled Research Site 1 and Research Site 2. Research Site 1 was located in the highlands region, while Research Site 2 was located in the southern coastal region of Papua New Guinea.

I employed a mixed methods research design which was informed by pragmatic and transformative-emancipatory theoretical positions (Creswell, 2005; Creswell & Plano-Clark, 2007; Mertens, 2005a; Tashakkorri & Teddlie, 1998). The mixed methods research design involved the administration of two survey questionnaires, interviews and focus groups at the research sites. In this paper I present the rationale for employing a mixed methods research design in studying attributions for academic achievement in secondary schools in Papua New Guinea.

### **Rationale for Undertaking a Mixed Methods Research Design**

Mixed methods research is an approach incorporating the collection, analysis and combining of quantitative and qualitative data in a single study. The four main types of mixed methods designs are explanatory, exploratory, embedded and triangulation (Creswell, 2005; Mertens, 2005a; Tashakkorri & Teddlie, 1998).

Two sets of viewpoints about mixed methods research exist amongst authorities on this subject. Some (e.g., Mertens, 2005a; Tashakkorri & Teddlie, 1998) have considered mixed methods research to be a philosophical framework that influences the entire research process. By contrast, others (e.g., Creswell, 2005; Mertens, 2005a) view it as a data collection and analysis technique. However, in their most recent work, Creswell and Plano Clark (2007) suggest a middle ground, providing a broad definition which defines mixed methods research as a research design with a philosophical framework that guides the process of data collection and analysis. Thus they define mixed methods research as a:

...design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process. As a method, it focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone. (p. 5)

Mertens (2005a) notes that, as a methodology, mixed methods research has its direct engagement in the complexity encountered by researchers in culturally diverse communities and complex educational and social contexts when addressing an educational or social problem. As a research design, mixed methods research contains philosophical assumptions that are linked to specific methods such as experimental research, survey and mixed methods research. Some authorities on mixed methods research (Creswell, 2005; Creswell & Plano-Clark, 2007; Mertens, 2005a; Tashakkorri & Teddlie, 1998) identify the three most common mixed methods designs as triangulation, explanatory and exploratory designs. Each of these focuses on the collection, analysis and interpretation of separate but complementary quantitative and qualitative data.

In my doctoral research I employed an explanatory mixed methods design in which data from two survey questionnaires, interviews and focus groups were collected and analysed sequentially. Data collection and analysis commenced with data from the two survey questionnaires and continued with a follow-up with interviews and focus groups. This process was essential for the elaboration and extension of specific findings emerging from the quantitative data, such as statistical differences among groups or unexpected results in the participants' own words in a follow-up phase of the study (Creswell, 2005; Creswell & Plano-Clark, 2007; Mertens, 2005a).

### **The Nature of the Context and the Phenomenon under Investigation**

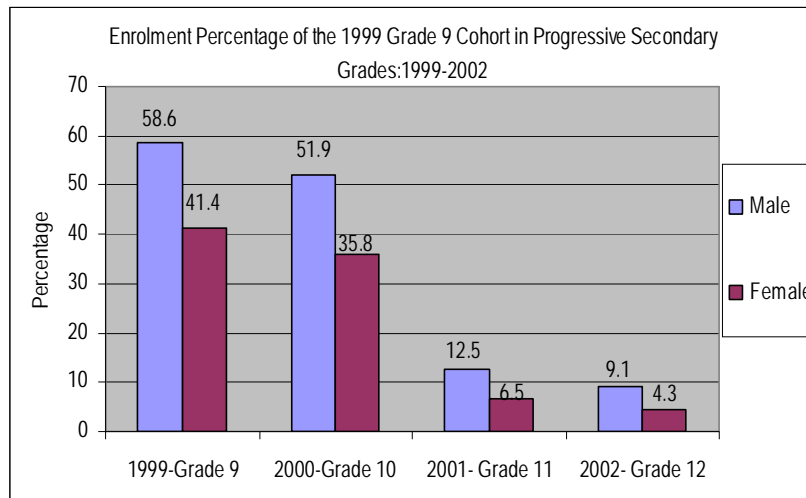
It was imperative for the doctoral research design to address the nature of the research problem within the given context. In the study, an analysis of secondary school enrolment data, containing data about Papua New Guinean students in the National Education System (NES) by the National Department of Education (1999, 2000, 2001, 2002, 2003), was conducted. The analysis of data revealed that there have been general increases in the enrolment of Papua New Guinean students in the secondary schools under the NES over the years. These were principally contributed to by the educational reforms which resulted in expansion in the secondary level. However, despite these increases the reality has been the dilemma of significantly declining enrolments for both male and female student cohorts in successive secondary school grades. The declines have been particularly significant for female students.

The declines between Grades 9 and 10 have most likely occurred owing to issues such as socio-economic constraints, the socio-cultural environment and societal attitudes towards women and girls. However, one of the key contributors to very sharp enrolment declines at the secondary level, specifically between Grades 10 and 11, has been the use of examinations in Grade 10. Students who have not met academic requirements for entry to Grade 11 studies have dropped out of Grade 10. Two examples illustrating the plummeting school enrolments are presented in Figures 1 and 2.

Figure 1 illustrates a decline in enrolments that has been experienced in successive secondary grades in Papua New Guinea. As is shown on Figure 1, in 1999 when students in the NES enrolled in the first grade of secondary education, Grade 9, there was a total of 23,501 students. This comprised 13,776 (58.6%) male students and 9,725 (41.4%) female students. However, by Grade 10 the enrolment of the cohort had reduced to 20,616 students. This comprised 12,204 (51.9%) males and 35.8% females. In Grade 11, enrolment took a sharp decline to become 4,470 students, who comprised 2,934 (12.5%) male students and 1,536 (6.5%) female students. By 2002, when the same cohort reached Grade 12, the enrolment of the cohort reached 3,144 students, comprising 2,138 (9.1%) male students and 1006 (4.3%) female students (Papua New Guinea National Department of Education, 1999, 2000, 2001, 2002).

Similarly to the 1999 Grade 9 cohort, Figure 2 shows a drastic decline in the enrolments of the Grade 9 cohort of 2000 in successive secondary grades. The Grade 9 cohort of 2000 comprised a total of 24,885 Papua New Guinean students in the NES. Male enrolment for the Grade 9 cohort of 2000 was 14,570 (58.5%) compared to 10,315 (41.5%) for female enrolment. The Grade 10 enrolment of the cohort declined to 22,781. This comprised 13,400 (53.9%) male students and 9,381 (37.7%)

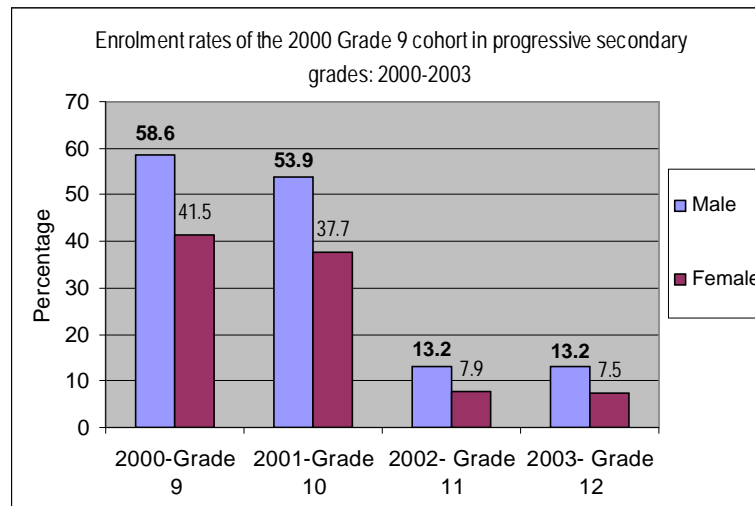
Figure 1: Percentage of the 1999 Grade 9 cohort in successive grades 1999-2002 (n = 23,501)



Source: Papua New Guinea National Department of Education Corporate Data Branch, 1999-2002

female students. By 2002, when they enrolled in Grade 11, their enrolment was drastically reduced to 5,258, of whom 3,287 (13.2%) were male students and 1,971 (7.9%) were female students. When they enrolled in the final grade of secondary education, Grade 12, there were only 5,143 students comprising 3,289 (13.2%) male students and 1,854 (7.5%) female students (Papua New Guinea National Department of Education, 2000, 2001, 2002, 2003). This is illustrated in Figure 2.

Figure 2: Enrolment rates of the Grade 9 cohort of 2000 in successive grades (N: 24,885)



Source: Papua New Guinea National Department of Education Corporate Data Branch, 2000-2003

Similar trends in enrolment were reported in Malawi and Kenya in Africa (Chamdimba, 2003; Kiluva-Ndunda, 2001). In these countries, as in Papua New Guinea, governments use highly selective national examinations as a measure of controlling access to successive levels of education owing to limited resources, schools and tertiary institutions.

In reviewing work by Papua New Guinean researchers and writers, I noted several socio-economic constraints, aspects of the socio-cultural environment and societal attitudes that have been identified as having contributed to such significant declines in female students' enrolments in successive secondary grades.

### *Socio-economic constraints*

Tawaiyole (2004) noted preferential treatment of sons over daughters, although this attitude is slowly changing. However, as the cost of education increases, parents tend to be prepared to give more education to their sons than to their daughters. In Papua New Guinea, education is neither compulsory nor free but the government does subsidise the cost of education. However, as more than 80% of the population live in rural communities surviving on a subsistence economy, many parents find it difficult to pay their share towards educating their children.

### *The socio-cultural environment*

Mixed methods research was appropriate for this study owing to a consideration of the complexity that existed in the socio-cultural environment of the participants. Embedded in this unique socio-cultural environment are sets of values, belief systems, attitudes and the systems of social stratification that have, in some way, impacted on participants in this study. In my doctoral study participants were drawn from culturally, ethnically, linguistically and geographically complex and diverse communities; thus there was a need to categorise participants on the basis of the two research sites.

Research Site 1 was selected for its predominantly patrilineal communities of the highlands region of Papua New Guinea. In this part of Papua New Guinea, people trace their descent through successive generations of males to a common male ancestor and males dominate. Males in the highlands also hold land in common, although variations on this mode of ownership do exist (Flaherty, 1998). Participants from the highlands site also represented diverse tribal groupings who speak distinct languages.

Participants from Research Site 2 were from a predominantly matrilineal coastal-islands region where people trace their descent through successive generations of females. Females in matrilineal societies often have rights of descent and land, but sometimes they have only the rights of descent while the rights of land are passed through mothers' brothers (Flaherty, 1998). Females in this area are highly valued and represent distinct matrilineal cultures, ethnic and language groupings on the mainland and the islands.

### *Societal attitudes towards women and girls*

Webster (2004) identified the lack of female role models in rural areas of Papua New Guinea as providing no motivation among younger females and creating unnecessary fear among parents of losing their daughters through education. Consequently, parents withhold their daughters at home for fear that their daughters might go to school and, once educated, marry men from distant tribes and not return home. Without role models in the remote areas of Papua New Guinea, it becomes difficult for people to understand the potential of females in a male dominated world. Under these

circumstances, female students' education tends to be devalued, thus resulting in the discontinuation of that education.

In recent years, issues relating to the safety of female students in school, between home and school or at home have become an area of concern for both parents and educational authorities owing to the increase in violence against and exploitation of females in the community. As highlighted by Robins (2005) and Webster (2004), there are children who are in situations of exploitation and their hope of finding refuge and a sense of hope in life lies in education. Unfortunately, female students are much more susceptible and have fallen prey to the evils of exploitation by some males, teachers and non-teachers, who have no respect for the young female population. This often arises from complex issues, thus indicating a breakdown in the values and social fabric of the society. Lack of respect, as evident in the incidents of breaking and entering into female dormitories and rapes in boarding schools and rapes that occur between home and school or even at home, creates insecurity amongst female students and their parents and guardians. Thus, the issue of safety in school or between home and school constantly exerts a psychological struggle for many female students and their parents and guardians.

### *The position of the study*

Whilst some socio-economic constraints and aspects of the socio-cultural environment, as well the societal attitudes towards females, have impeded the education of female students in Papua New Guinea, an equally significant issue that contributes to the decline in enrolments of female students has not been highlighted. This concerns the academic achievement of female students in successive school assessment and its subsequent impact on their achievement in the summative assessment which comes in the form of the national examinations in Grades 10 and 12. Given that academic achievement is used in determining who completes the full cycle of secondary education, it was imperative to undertake an examination of issues affecting the academic achievement of female students. Thus, as part of the process of examining the key issues that impact on female students' academic achievement, it was also important to examine the socio-psychological aspects of former female students who had left school without completing the full cycle of secondary education and current female students who were in Grade 12. These socio-psychological aspects included the female students' personal beliefs, perceptions and values about issues that influence their academic achievement in secondary schools.

Thus, in my doctoral research I specifically focused on examining the issues that influence the academic achievement of female students in secondary schools, which concern a significant proportion of the population in a developing nation. Although the secondary school female students represented a very privileged group of girls who had gained entry into secondary education through a selection process based on their academic merits, the decline in their enrolment has been significant and is also a strong indication of their under-representation in the secondary schools. Their under-representation was also highlighted by Tawaiyole (2004) in her research article entitled "The Dilemma of Subject Choice". She revealed another face of under-representation/over-representation in the subject areas studied in Grades 11 and 12. Girls who were successful in undergoing secondary education were found to have been under-represented in the areas of sciences and mathematics but over-represented in the arts and language.



## **The Theoretical Positions of the Study**

In developing the methodological frameworks underpinning my doctoral research, I was guided by two theoretical positions which are closely allied to mixed methods research design. These were the pragmatic and transformative-emancipatory positions (Creswell & Plano-Clark, 2007; Mertens, 2005a; Tashakkorri & Teddlie, 2003).

A pragmatic theoretical position was employed in this study as it places greater emphasis on the research questions than either the research methods or the underlying worldviews guiding those research methods. It is typically associated with mixed methods research, embraces pluralism and focuses on 'what works' in obtaining research data and results (Creswell & Plano-Clark, 2007; Mertens, 2005a; Tashakkorri & Teddlie, 1998). Tashakkorri and Teddlie (1998) point out that "pragmatists decide what they want to research, guided by their personal value systems; that is, they study what they think is important to study" (p. 27). In my doctoral research, I set the parameters for the study, the key questions for consideration and the data collection instruments that I wanted to use, which necessitated the employment of both quantitative and qualitative methods of data collection and analysis.

The transformative-emancipatory position provided my doctoral study with the basis for including the viewpoints of an under-represented group of former and current secondary school female students in Papua New Guinea. According to Creswell and Plano Clark (2007), Mertens (2005a, 2005b) and Tashakkorri and Teddlie (1998), the inclusion of the values and viewpoints of marginalised groups is imperative in this position. Mixed methods research within the transformative-emancipatory framework emphasises the importance of research in promoting social change by addressing issues of empowerment and other issues affecting marginalised groups such as women and people with disabilities (Creswell, 2005; Creswell & Plano-Clark, 2007; Mertens, 2004; Tashakkorri & Teddlie, 1998). My doctoral study provided an opportunity for participants to convey their experiences about what inhibited or facilitated their academic achievement in Papua New Guinean secondary schools through the use of survey questionnaires, interviews and focus groups. Participants' views obtained through a mixed methods design were critical in planning change in areas that hinder the academic achievement of students, particularly girls.

In undertaking mixed methods research with different theoretical positions, I took advantage of the strengths of each theoretical position to investigate the research phenomenon of this study. Creswell (2005) and Greene and Caracelli (1997) argue that such differences between different worldviews reflect different ways of understanding and valuing the social world.

## **Conclusion**

In this paper I elaborated the rationale for employing mixed methods design in my doctoral research which focused on female students' academic achievement in secondary schools in Papua New Guinea. I selected mixed methods research design in consideration of the uniqueness and complexities that exist in culturally diverse communities and the complex educational and social contexts in Papua New Guinea when addressing an educational problem. I conducted the study in two geographically contrasting sites and involved participants who were culturally and linguistically

diverse. Educationally, they represented two main groups: those who left school without completing a full cycle of secondary education; and those who were successful in reaching Grade 12.

In developing the methodological frameworks underpinning my doctoral research, I was guided by two theoretical positions which are closely allied to mixed methods research design. These were the pragmatic and transformative-emancipatory positions. Because I had set the parameters for the study, the key questions for consideration and the data collection instruments that I wanted to use, the pragmatic position was relevant to my doctoral research. The transformative-emancipatory position was important for my doctoral research as it provided the basis for including the viewpoints of an under-represented group of former and current secondary school female students in Papua New Guinea. The transformative-emancipatory framework within mixed methods research was important as the study aimed at promoting social change for an under-represented population. In undertaking a study embracing two different theoretical positions, I took advantage of the underlying principles that each worldview provided in order to understand my own research phenomenon. I also took the position that such differences indicated that there were different ways of knowing and valuing the social world.

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