

Research and Thesis writing

3. Thesis structure guidelines

3b. Sample Introduction from Engineering, Biology & Education

Example for Biology



1. Research models and methods



2. Developing a research proposal



3. Thesis Structure guidelines



3a. Sample Abstract from Engineering & Biology



3b. Sample Introduction from Engineering, Biology & Education



3c. Sample Methods section from Biology, Engineering & Education



3d. Sample Results section from Biology & Education



3e. Sample Discussion section from Biology



3f. Sample Conclusion from Engineering & Education



4. Thesis writing and persuasion

Learning objectives

This module will help you to:

- learn about various research models.
- prepare a research proposal.
- structure your thesis and its chapters.
- write convincingly of your research outcomes and implications



Although studies have shown that diet has an important influence on a mammal's overall biology (e.g. McNab 1983), little is known about the feeding ecology of many Australian species. One species, the yellow-bellied glider (*Petaurus australis*), which weighs up to approximately 700g, is the largest of the arthropod and exudate-feeding marsupial gliders (see Smith & Lee 1984). It has a widespread but patchy distribution in eastern Australia and is characterized by low population densities (Henry & Craig 1984, Kavanagh 1984). Relatively little research has been centred on the feeding behaviour of this species because of difficulty in its detection and capture (Craig & Belcher 1980).

One study (Wakefield, 1970) concluded that while yellow-bellied gliders obtain sap from the 'V'-shaped incisions they make in the trunks of various species of eucalypt arthropods comprise the bulk of their diet. This conclusion, however, was based on limited feeding observations and the irregular occurrence of these 'sap-site' trees.

Other studies conducted analyses on faecal samples from north Queensland and Victoria respectively (Smith and Russell, 1982; Henry and Craig, 1984; Craig, 1985) to determine feeding behaviour). These studies found the presence of arthropods, eucalypt sap, nectar and honeydew; however, as insect and plant exudates are almost totally digested and leave little trace in the faeces other indicators must be used to infer their use (Smith & Russell 1982). Bark, for example, is used as an indicator of eucalypt sap. Faecal analysis, therefore, does not allow a precise determination of the relative importance of each of the separate dietary items.

Studies using qualitative observations of feeding behaviour in gliders have also been carried out (Henry and Craig, 1984; Craig, 1985; Kavanagh and Rohan-Jones, 1982; and Kavanagh, 1987a,b). In these studies each observation is scored equal, regardless of duration, thus these data indicate only the presence or absence of food items in the diet, not their relative use. A study employing the use of

establishing the field

summarising previous research

main point about previous research in this area

findings of one study using limited observations

other studies using faecal samples to infer feeding behaviour

Other studies assessed the presence of food items in the diet, not the differential proportions of each food item in the diet.

timed (i.e. quantitative) feeding observations is necessary — identifying the gap to give a better resolution of the species' dietary requirements. This study was aimed at achieving this by addressing the following question: are different food resources exploited in different proportions throughout the year? — aims of this research

Example from Engineering

Advanced ceramic materials such as zirconia have great potential as substitutes for traditional materials in many engineering applications; however, a number of problems have thus far restricted their use by engineers. Two of the major problems are difficulties in producing products of reliable and consistent quality ' and the high cost of manufacture. — establishing the field

Difficulties in achieving reliable and consistent quality stem largely from problems associated with the handling and forming of fine ceramic powders, and from the formation of thermal gradients that often occurs during conventional sintering processes. Advances in powder processing of ceramic powders are helping to overcome the first of these problems, but only slow, controlled heating and cooling rates have been used to solve the problem of formation of thermal gradients. While this solution facilitates the manufacture of high quality components, it does so at the expense of production rate, and deterioration of the mechanical properties of the ceramic because of an increase in grain size. This solution is thus one that achieves quality at the expense of an economical production rate. — preparing for present research - showing the gap

To date, this slow, controlled heating has been achieved with the use of techniques incorporating high temperature sintering for lengthy periods in conventional furnaces, or through exposure to high temperatures and pressures in processes such as hot pressing. Such processes require expensive capital equipment, use large amounts of energy, and are capable of only relatively low production rates. Processes involving temperatures above 1700 ° C are particularly costly.

Recently, interest has been growing in alternative sintering techniques that could overcome this problem. One of the most promising is the use of microwaves to sinter ceramic compacts. Microwave sintering has many attractive features, including rapid volumetric heating and low cost. The equipment for microwave sintering is also less costly than that required for conventional processes and requires less maintenance. With energy savings calculated to range from 25 to 95 % and higher production rates, this process is commercially attractive. Microwave sintering may have other advantages as well, as there is some evidence that the mechanical properties of microwave-sintered ceramics are superior to those of conventionally-sintered ceramics. This superiority has been largely attributed to the smaller grain sizes resulting from the short, rapid sintering cycle.

Until now, there has been no report of any systematic study of the microstructures produced by microwave sintering, or their relationship to the properties of the sintered product. The aims of this project were to develop a simple technique for microwave sintering of yttria zirconia, and to compare the resultant properties and microstructure with material sintered by conventional constant heating rate processes. The relationships between density and grain size were studied in order to determine whether microwave heating altered the densification/grain growth relationship. Such a change would indicate a change in the predominant mechanism of mass transfer. The effects of heating rate and yttria content were also investigated.

← identification of the gap
 ← introducing present research

EXAMPLE INTRODUCTION (from Education)

1.1 A Statement of Aims
 This study is about the production and reproduction of subjects and subjectivities in and through the practices of teachers and students in physical education lessons. It will investigate the ways in which students and teachers position themselves and are positioned by others in relation to patriarchal discourses of sexuality. In particular it seeks to explain how the systems of knowledge and beliefs (discourses), determining and determined by the genre of the physical education lesson, intersect with other relevant discourses of the body to reproduce or challenge patriarchal expectations of masculinity and femininity. How this in turn affects female and male students' relation to physical activity will also be examined.

← establishing the field
 ← specific area of research

The main window into the study will be through an analysis of the language of teachers and students. However the meanings constituted in and through language use cannot be understood adequately without attending to the non-verbal context in which it is used. Non-linguistic practices that regulate the body are also important to a more complete understanding of the female subject as an embodied subject. Physical education is centrally concerned with 'work' on the body, with the regulation and control of the body through both the ritualised practices of sport and physical education lessons and through the scientific, medical rationales that underlie these practices (Hargreaves, 1986). Historically, sport and games have been among the most public forums for the display of male and female difference. Medial representations of women in sport continue to contribute to the (re)production of traditional expectations of femininity. In schools, the dominant cultural beliefs about masculinity and femininity circulating in the wider culture are likely to be replicated in the organisation of schooling, including the allocation of resources, programming, staff allocation and within classroom practices themselves.

← context of the study

1.2 Background and Rationale

1.2.1 *Equal opportunity in education and physical education*

review of previous research in the general area

This project was initially designed to examine the contribution the school environment makes to the low participation and fitness of adolescent girls. ...

In physical education, the shift was primarily characterised by research into the effects of co-educational physical education on opportunities and participation rates of girls in physical activity. ...

It is within the tradition of ethnographic studies of school and classroom environments that this study is broadly located. ...

The more modest aim of changing school practices is the one most likely to be taken at the level of policy makers and state and school based programmes of educational reform in relation to equity issues. ...

A concern with change remains the underlying motivation for this study. ...

This feminist purpose is expressed in a concern to investigate the ways in which patriarchal discourses intersect in the practices of physical education lessons to produce possible subject positions and subjectivities for students and teachers in relation to femininity, masculinity and physical education. Further, it asks how physical education contributes to the production of embodied subjectivities which are more or less able to contest patriarchal positioning.

1.2.2 *Women and physical activity: an historical overview of the literature.*

review of previous research in specific area

As mentioned above, much of the early writing in physical education and sport (and the continuing contemporary non-academic argument) took a liberal feminist position – that is, that women are treated unfairly in being denied access to material resources, media coverage, prizes and so on. The Australian Commonwealth government-sponsored *Fit to Play* Conference in 1980 brought together women from the academy, sporting bodies, women's community organisations and the government to identify women's concerns and needs. It was the first of a number of Commonwealth government-sponsored working parties and projects to identify prevailing inequalities and to develop strategies to address these (for instance, Women's Working Group on Sport and Media, Commonwealth Schools Commission Project: Physical Education, Girls and Self Esteem; and the formation of Women's Sport Foundation)³. Studies by Coles (1980) and Hawkes (with Dryen, Torsh and Hannan, 1975) identified marked inequities in the resourcing of girls' physical education and sport as compared to boys' in terms of finance allocation of playing space, provision of equipment, timetable preferences and choice of an activity.

Underpinning this research and government efforts to increase equity, valuable as they might have been in terms of getting a bigger 'slice of the pie', was the assumption that sport as it was, was equally desirable for all, for all men and all women. ...

Since much of the 'scientific writing' outside the area of exercise physiology and biomechanics in sports discourse is in psychology, sex-role theory made an important contribution to the further explanation of differences in performance and participation (see for instance, Reis and Jelsma, 1980). ...

In education, the liberal feminist position was expressed through arguments and finally legislation against discrimination. ...

Whereas many schools in other states already had co-educational physical education, in New South Wales the main effect of the legislation was the encouragement but not the mandate from the Education Department to change what had been almost universal single sex physical education into co-educational classes. ...

In North America the equivocal consequences of Title 1X raised doubts about simple solutions that provide women with the 'same' opportunities as men. ...

Increasingly, those writings on gender issues in the major sport sociology journals such as *Quest*, *the Sociology of Sport Journal* and the *International Review of Sport Sociology*, have drawn critical social theory, cultural studies and other feminist positions (other than liberal) to inform the subject, methodology and interpretation of their work. ...

The ethnographic work of Scraton and, to a certain extent, the classroom interaction studies of Giffin et al (1981; 1983) have the closest immediate links with the present study. Although Hargreaves (1986), Scraton and others have to some extent investigated physical education and sport as sites of regulation and (re)production, none of these studies has systematically addressed the part played by the linguistic choices of students and teachers in this process. This study fills that gap and in doing so provides a more substantial model of classroom interaction by which teachers may come to analyse and change their practices.

1.3 Methodology

The study originated from a need to explain the differences in participation rates between boys and girls in physical activity. It was conceived as an ethnographic study working towards a 'grounded theory' that would emerge out of several cases studies of secondary schools. These schools were to be selected to cover the various combinations of female and male teachers, taking single-sex and mixed classes. It was intended that using the fieldwork tools of observation, open-ended interviewing and the analysis of curriculum and other relevant documents, certain trends would emerge to answer the original questions and to explain the differences in the experiences of boys and girls in relation to physical education and sport. ...

This is the final paragraph of a section introducing present research. Notice how it identifies the gap that will be filled by this research. The methods section is the logical 'next step' that shows how the research will be carried out.

This methodology section follows the introductory section and precedes a short section that outlines the chapters of the thesis.

At this stage of the study, several broad questions could be said to inform the interpretation of the lesson texts:

- Were there differences in the language resources that teachers drew on to make meaning?
- Was there a difference that could be attributed to the sex of the teachers and/or the sex of the students?
- If differences existed, what were the consequences of such differences for students in terms of their understandings of themselves as male and female and in terms of their attitude and behaviours in relation to physical activity?

This last question took the study beyond a comparison of differences to the issue of the very production of gendered subjectivities. Although a broad theory of social and cultural reproduction that argued for the reproduction of society through its institutions (Connell, 1977; Hargreaves, 1986) had provided some explanatory power for the study to this point, it was no longer adequate to provide the link between what teachers did and said, and students' consciousness of themselves in terms of masculinity and femininity. ...

rationale for the broadening of the study

... Although there are some problems (as well be discussed in Chapter 2) with the degree to which individuals and their actions are wholly determined by discourses and discursive formations, Foucault's 'Genealogical' approach, which maps the operation of discourses and their production and influence at any one time, was important to the development of the study at this stage.

This section provides a rationale for using history and culture as interpretive tools that add meaning to the data gathered in the classroom.

It became clear that in order to understand what was happening in physical education classrooms I would need to understand how the very structure of physical education lessons in general (the genre of the physical education lesson) and the experiences of the teachers and students, that is, their previous experience of discourses and discursive practices, determined their behaviour in the instance that was being analysed. That is, to what historically and culturally constituted discourses associated with physical education, sport and sexuality had the participants in the lessons been exposed and how were these enacted in their practices? Further, a 'genealogical' approach provided the means to argue that the interactions of teachers and students were in themselves productive and reproductive of discourses and, most importantly for this study, discourses of masculinity and femininity.

In practice then, this led to the decision to trace the production of those discourses that most affected the field of physical education – that is, to examine the historical production of the genre of the traditional physical education lesson and the discourses that it realises. An understanding of student and teacher subjectivities also meant investigating the cultural resources outside of the school genre and discourses on which they drew to make meaning in the lesson – for instance the discourses that informed the media ... representations of women and men in sport.

1.4 Outline of the Thesis

The thesis organisation is informed by the theory underpinning the analysis as a whole. After critically reviewing this theory in Chapter 2, Chapters 3, 4 and 5 provide the cultural and social context by which the analysis in the later chapters may be understood. Thus, Chapter 3 provides a description of the historical context demonstrating how certain discourses became the dominant discourses, how these relate to present day practices in physical education and how these both reflect and maintain hegemonic gender relations. Chapter 4 identifies contemporary discourses of hegemonic masculinity and femininity in relation to sport as they are produced and reproduced through the most public area of human knowledge and belief systems – newspapers and television. Chapter 5 signals the beginning of the empirical work of the study but also in its description and analysis of the interviews with teachers and students provides an understanding of the subjectivities and perceptions that teacher and student have of male and female attitudes to, and capabilities for, physical activity and physical education.

Chapter 6 contains the substantive material around which the thesis as a whole is based by focusing on the lessons and the teachers that have been recorded for the study. It provides a detailed analysis of the ways in which teachers and students draw on various discourses and genres to construct each other as male or female. This chapter also investigates how the discourses identified in Chapter e, 4 and 5 intersect in physical education lessons and in the bodies of individual subjects to produce a context in which certain sets of social relations and subject positions are available for teachers and students...Chapter 7 uses a particular model of genre as proposed by Bakhtin and more recently developed by Kress and Threadgold to analyse the lessons in terms of their normative and non-normative generic realisations. The latter are interpreted in terms of the ...Chapter 8 discusses the implications of the study in general terms and proposes future directions. Where appropriate ...

1.5 An Autobiographical Note

The researcher's own subjectivity is clearly an important factor in the selection of topic, methodology and explanatory theory. The form that this study take relies particularly on the interpretations of the researcher as a member of the culture in which the participants in the study are located and more specifically on her experiences in the field being studied. It is therefore important to include a brief description of the researcher's autobiographical background as it pertains to the study

...

overview of the thesis. This is important for giving the reader/examiner an understanding of the thesis as a whole.

A brief outline of the writer's philosophical/theoretical stance is provided here. This is common in some humanities theses.