CHAPTER ONE

INTRODUCTION

Provision of quality examinable Physical Education to students in their final two years of schooling in the context of international schooling is the focus of this research. Physical education was accorded the status of a ‗fundamental right for all' in the United Nations Educational, Scientific and Cultural Organiation's (UNESCO) International Charter for Physical Education and Sport (1978, p. 73), a document which also emphasised the need for the inclusion of the subject within all education systems. In an effort to ensure quality provision, a stronger foundation of research-based evidence is required to inform future practice. Such practices may include curriculum change and/or development, teacher preparation, resource management and student learning.

Amongst a rise in popularity of both examinable Physical Education and international schooling in Australia, a new subject, *Sports, Exercise and Health Sciences* (SEHS) was introduced into the International Baccalaureate (IB) Diploma Programme as a pilot subject in 2007. The introduction of SEHS provides a unique and timely opportunity in which to pursue research in this area. Research proposed in this thesis is focused on a detailed examination of the experiences of one group charged with piloting the subject in an Australian secondary school. Findings may have the potential to inform future experiences of other schools and further research in this area.

Chapter One is organised into four main sections. The first describes an educational context for the research. The second section provides an overview of the investigation and the third describes the organisation of the thesis. Finally a summary of the chapter is provided.

EDUCATIONAL CONTEXT OF THIS RESEARCH

This section provides an educational context for this research and is presented under examinable physical education, international education, international baccalaureate diploma program, Sports, Exercise and Health Science, and the piloting of the SEHS.

Examinable Physical Education

Students in many countries, including Australia, New Zealand and the United Kingdom, can now choose an examinable Physical Education course in their final two years of secondary schooling. Furthermore these subjects have been recognised by curriculum authorities as school subjects that contribute towards entry requirements for university courses in their respective countries. Despite this recognition as a legitimate university entrance subject, a meta-search of literature in English yielded limited research relating to examinable Physical Education.

Since its introduction as an examinable Higher School Certificate (HSC) subject in New South Wales, Personal Development, Health and Physical Education (PDHPE) has experienced somewhat of an explosion in student numbers. This growth is illustrated by the fact that when it was examined as a HSC subject for the first time in 1992, only 1557 candidates completed the course. In comparison by 2009 PDHPE boasted 14,283 student entries, making it one of the most popular subjects behind only Mathematics, English, Business and Biology choices (NSW Board of Studies, 2012). The subject also experienced rapidly expanding numbers in Queensland (Macdonald, Kirk, & Braiuka, 1999) and in 2011 was the second most popular year 12 elective subject in the state (QSA, 2012). Similar subjects are also offered in the other Australian states and Territories[1]. Table 1.1 details the Examinable Physical Education subjects that to date are described within literature:

[1] Physical Education (Victorian Certificate of Education)- Victoria, Physical Education Studies (Western Australian Certificate of Education)- Western Australia, South Australian

Table 1.1. Examinable Physical Education Subjects described in literature

Subject	Award	Geographical Location	Curriculum Authority
Personal Development, Health and Physical Education	Higher School Certificate	New South Wales, Australia	New South Wales Board of Studies
Health and Physical Education	Queensland Certificate of Education	Queensland, Australia	Queensland Studies Authority
Physical Education	National Certificate of Educational Achievement	New Zealand	New Zealand Qualifications Authority
A-level Physical Education	General Certificate of Education	England, Northern Ireland and Wales	Qualifications and Curriculum Authority
Higher Grade Physical Education	Higher National Certificate	Scotland	Scottish Qualifications Authority
Physical Education	Leaving Certificate	Republic of Ireland	The National Council for Curriculum and Assessment

Examinable Physical Education has experienced a similar pattern of rapid growth and expansion in England where it is offered as an Advanced (A) level examination subject to students in their post-compulsory years of schooling. As Green (2004, p. 145) explains the subject has grown from 35 candidates in its initial year as an A level subject in 1985 to almost 19,000 in 2003. The subject's popularity has continued to rise steadily over the past few years and in the 2008/2009 academic year the number of students taking A level Physical Education had risen to 21,609 (6.1% of total candidates) (DfES, 2010). Further evidence for the expansion of Physical Education is evident in the inclusion of Sports Science as 1 of 27 subjects

available to students in the newly introduced Cambridge Pre-U, a diploma style post-16 qualification offered to students in England by University of Cambridge International Examinations (CIE, 2012).

More recently this growth has spread into the realm of international education with the piloting of SEHS in the International Baccalaureate Diploma Programme. An examinable Physical Education subject has also been offered in international schools as part of Cambridge International A-level qualification, a curriculum taught in many British International Schools. The meta-search yielded no research results relating to these courses.

International Education

International education is now an established and well researched field of practice (James, 2005, p. 313). Interest in the area of international schooling has arisen out of the marked rise in popularity of this form of education in recent years. While the term international education has been widely used in educational research there is debate over how the term is used and what it actually means (Drake, 2004; James, 2005). For the context of this study the term international education is used to refer to a curriculum program that is offered to students throughout the world. In particular this study examines the IB Diploma Programme, a qualification offered by the International Baccalaureate Organisation[2].

International Baccalaureate (IB) Diploma Programme

The IB Diploma Programme is an academically challenging and balanced two-year program of international education structured in a way that will prepare and qualify students for entry into the world's leading universities (IBO, 2011b). In the two years students are required to study six subjects at Higher or Standard Level. Students must choose one subject from each of groups 1 to 5 (Studies in Language and Literature; Language Acquisition; Individuals and Societies; Experimental Sciences; Mathematics and Computer Science. See figure 1.1 below) with the sixth

[2] A more detailed examination of the International Baccalaureate Organisation and its place in international education is provided in Chapter Two.

subject coming from either group 6 (The arts) or another subject from groups 1 to 5. According to the IBO this ensures students gain a —breadth of experience in languages, social studies, the experimental sciences and mathematics" (IBO, 2011b)

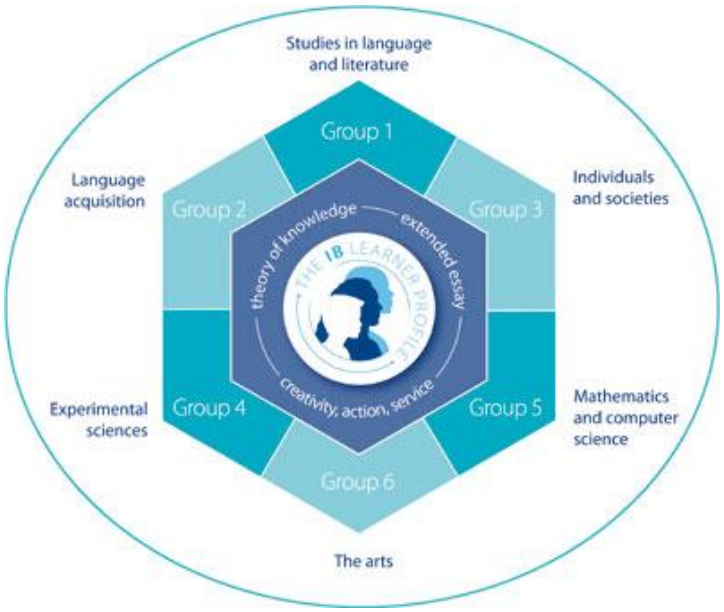

Figure 1.1. IB Diploma Programme subject groups (IBO, 2011a)

The IB Diploma Programme has three additional core requirements that are included to —broaden the educational experience and challenge students to apply their knowledge and understanding" (IBO, 2011b). These are:

- Extended essay: requiring students to engage with in-depth research in one of their chosen subjects.
- Theory of knowledge: a course students are required to take that encourages them to reflect on the nature of knowledge and how it is acquired.
- Creativity, action and service: requiring students to actively learn from participating in experiences beyond the classroom.

Diploma Programme students typically study three of their subjects at Higher Level and the remaining three at Standard Level[3] (IBO, 2011a).

Sports, Exercise and Health Science (SEHS)

SEHS is a Standard Level (SL) Diploma Programme subject which lies within the Group 4 Experimental Sciences. According to the subject draft syllabus document the SEHS –incorporates the traditional disciplines of anatomy and physiology, biomechanics, psychology and nutrition, which are studied in the context of sport, exercise and health" (IBO, 2009, p. 5). The draft syllabus also details that the subject is one that involves scientific investigation through practical experiments in laboratory and field settings. The following is a description of the key features of the SEHS taken from the IBO website:

- *SEHS is an SL course that requires 150 hours of teaching time over two years.*
- *The SEHS course follows the group 4 SL curriculum model; a core syllabus and a choice of four options. Students are required to spend 40 hours on practical/investigative work.*
- *The SEHS course incorporates the disciplines of anatomy and physiology, biomechanics, psychology and nutrition, which are studied in the context of sport, exercise and health.*
- *A combination of syllabus content and experimental work provides the opportunity for students to acquire the knowledge and understanding necessary to apply scientific principles and analyse human performance.*
- *The SEHS course has strong international dimensions such as international sporting competition and the international bodies that regulate them. Ethical issues that exist within sporting competitions are considered.*
- *The comprehensive curriculum provides excellent preparation for university courses including those specifically related to Sport, Sports Science or Physical Education. (IBO, 2012)*

[3] Higher Level courses represent 240 teaching hours. Standard Level courses represent 150 teaching hours.

Students studying SEHS are also required to do a compulsory group 4 project. This is explained to be a *"collaborative and interdisciplinary exercise which provides an opportunity for students to explore scientific solutions to global questions"* (IBO, 2012). It is important at this point to acknowledge that whilst SEHS is included within the experimental sciences subject group, the format and content of the subject are consistent with other similar 'Physical Education' courses[4]. A discussion relating to the nature of subject content considered to be 'Physical Education' is contained in review of literature in Chapter Two.

Piloting of SEHS

Sports, Exercise and Health Science is currently a standard level (SL) pilot subject which will be on open offer to all IB schools from September 2012, with first examinations in May 2014 (IBO, 2012). To date, the subject has only been offered in 14 pilot schools worldwide, two of which are located in Australia. This is the second time that the research site has been involved in the piloting of a new Diploma Programme subject.

OVERVIEW OF THE INVESTIGATION

This investigation is outlined under the following sections of: statement of the research focus; significance; research design; limitations of the study; and definition of terms used through the thesis.

Statement of Research Focus

The purpose of the study is to investigate the introduction of Sports, Exercise and Health Sciences (SEHS) into the International Baccalaureate Diploma Programme at the research site. The study will examine the experiences of staff and students at an Australian secondary school involved in the piloting of SEHS to identify key issues relating to the implementation of this curriculum change at the research site.

[4] This is based on the researcher's knowledge of the SEHS syllabus in comparison to other Physical Education subjects discussed in Chapter Two.

A primary aim of this research study was to develop an understanding of the degree to which the Rogan and Grayson‘s (2003) theoretical model of curriculum implementation framed the processes experienced at the Pilot School. The focus of the thesis is described by the central research theme:

> What is the alignment between the conceptual framework for curriculum implementation (Rogan & Grayson, 2003), and the processes of implementation of the SEHS at the research site?

More specifically the thesis was designed to investigate the following research questions.

> Research Question 1. From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Profile of Implementation?
>
> Research Question 2. From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Capacity to Innovate?
>
> Research Question 3. From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Outside Supports?
>
> Research Question 4. Based on the experience of piloting of SEHS curriculum what advice would the participants at the research site provide to other schools contemplating enacting SEHS?

The findings have the potential to inform the processes and implications for other schools in the implementation of SEHS at their site.

Significance

The rise in the popularity of the IB Diploma Programme has led to an increasing demand for the IBO to cater for the demands of greater variety of students. This, coupled with increasing popularity of examinable forms of physical education, provides a context for this study examining the piloting of SEHS in the Diploma Programme at an Australian secondary school. Specifically this study examines the introduction of SEHS from a curriculum implementation perspective.

At present there are gaps apparent in research relating to Physical Education in the international curricula, and in particular to the provision of examinable forms of the subject for secondary students in their final years of schooling. The piloting of SEHS at the research site provides a unique opportunity to investigate key issues faced by a range of school community members in the implementation of a Physical Education subject into the international curriculum. An understanding of the factors affecting the implementation of the subject at the research site may inform future practices relating to the subject area, including wider implementation of the subject, teacher education, and/or subject reforms.

Research Design

As the aim of this study is to develop an understanding of key issues that may arise in the introduction of SEHS into the IB Diploma Programme, case study research provides the opportunity to explore these issues through an investigation of a real-life situation in which this curriculum change will occur. The intention of this research is that this knowledge when set alongside existing literature may provide empirical evidence of the issues that may be faced in the widespread introduction of the subject. Rationale for the selection of case study research is discussed in more depth in Chapter Three.

This study will be an in-depth single case study. Specifically the case will be an Australian secondary school, which was involved in the piloting of the IB SEHS Diploma Programme subject. The school is a clearly identifiable case with the clear

boundaries of a set geographical location with a defined staff, student and parent population.

Limitations of the study

The scope of the study is limited to one research site due to the uniqueness of the case to be examined. The chosen research site is one of only fourteen schools worldwide piloting SEHS and the only school in state of New South Wales, and therefore is the only research site accessible to the researcher. The use of a single case is warranted in qualitative research if the case chosen is unusual or provides a unique opportunity for research (Eisenhardt & Graebner, 2007, p. 27).

The study is positioned within the implementation phase of curriculum change (Fullan, 2007), based on the assumption that there has already been an innovation phase that has lead to the piloting of SEHS. For this study the development of the curriculum innovation is assumed to follow a top-down model (Print, 1993) in that the change, the SEHS draft syllabus, has been passed onto the pilot schools from an educational authority, in this case the International Baccalaureate Organisation. In making these assumptions the dynamic nature of curriculum change is recognised and these phases are not viewed as a linear process. This is discussed further in the section of the paper related to the conceptual framework of the study.

Definition of Terms

Curriculum: a program of study consisting of written subject syllabus documents that are developed through collaboration and implemented by government and educational authorities.

Examinable Physical Education: A Physical Education subject offered to students in their final two years of secondary school which is formally examined. These subjects are typically recognised by tertiary institutions and subjects that may contribute to tertiary entrance scores.

IB: International Baccalaureate - Qualification awarded by the IBO which consists of three programmes. Primary Years Programme for learners 3-12 years of age,

Middle Years Programme for learners from 11-16 years of age and the Diploma Programme for learners from 16-19 years of age.

IBO: International Baccalaureate Organisation- educational authority responsible for the International Baccalaureate programs of study.

International: this term is used as an adjective to describe something that is used by people of many nations, in this case a common curriculum

International Education: the term international education is used to refer to a curriculum program that is offered to students throughout the world

International Schooling: Schools that offer a program of study, like those offered by the IBO, that students can study in different countries around the world.

SEHS: Sports, Exercise and Health Science - A Group 4 elective subject within the IB Diploma Programme

OVERVIEW OF ORGANISATION OF THIS THESIS

The remainder of this thesis is presented in five chapters. Chapter Two provides a review of literature relating to Physical Education, international schooling and implementation of curriculum change. Chapter Three provides a detailed description of methodological procedures used in the investigation of the research. Chapter Four presents the results of the study and a summary of the key findings. Chapter Five discusses the findings in relation to existing literature on curriculum implementation. The final chapter provides the findings illustrated in an enhanced case-based framework of implementation of SEHS. A discussion of the case-based framework and implications for future research and /or practice i.e. schools looking to implement SEHS in the future concludes Chapter Six.

SUMMARY

The piloting of SEHS in the IB Diploma Programme provides a unique opportunity to investigate issues faced by a range of participants in one school as they implement the subject at an Australian secondary school. This study will examine the experiences of staff and students involved in the initial piloting of the subject. The potential contribution of this research is to inform the discipline about a range of considerations relevant to the future implementation of the subject. This initial

research has the potential to build a theoretical foundation for researchers and educators interested in SEHS. The practical contribution of this research to other schools moves beyond the pilot phase to the full implementation of SEHS. Chapter Two provides a review of scholarly literature relating to the three areas that contribute to the focus of the study: Physical Education, the International Baccalaureate and curriculum change.

CHAPTER TWO

REVIEW OF LITERATURE

One of the most marked changes in recent years is the emergence and consolidation of examinable forms of Physical Education (Gore, Ladwig, Amosa, & Griffiths, 2008; Green, 2004; Macdonald, Kirk, & Braiuka, 1999). Despite this, at present a thorough critical reflection of literature relating to examinable physical education subjects is not possible as there has been insufficient research in this area, particularly in relation to post-compulsory years of schooling[5]. Furthermore there is an apparent dearth in research relating to the Physical Education subject area within international schooling research. As a result, this chapter provides a literature review of research from three areas central to the context of the study; Physical Education, the International Baccalaureate and curriculum change.

PHYSICAL EDUCATION

This section reviews the literature that is available relating to Physical Education in the school curriculum and, where possible, to the examinable forms of the subject that are offered to students in their final two years of secondary schooling. This section provides a brief history of examinable physical education, discusses the growth of examinable physical education, and concludes by highlighting barriers to the inclusion of physical education into the school curriculum.

Physical Education's place as a subject within the school curriculum has, in the last few decades, been a topic of significant interest to Physical Education researchers. Much of the research is centred on the perceived need to justify the subject's inclusion in the curriculum alongside the more traditional 'academic' subjects. As Whitehead (2000, p. 7) explains, whilst ample literature is available illustrating the

[5] Post-compulsory refers to the final two years of secondary schooling, typically preparing students for tertiary or career entry.

benefits of the inclusion of Physical Education, a view persists that the subject is recreation rather than education and this has made it necessary for the profession to be able to clearly articulate its value as an academic subject in the curriculum. Contributing to the challenge faced by those debating the worth of the subject is the lack of a clear definition of what actually constitutes _Physical Education‘ (Capel, 2000; Whitehead, 2000). A useful general definition for Physical Education is offered by Kirk, MacDonald and O‘Sullivan (2006, p. x) who use the term to refer to a _process of being educated in, about and through movement as a medium‘. This definition provides a context in which to understand the subject as one that involves academic study relating to the movement of the body through a range of experiences.

Brief History of Examinable Physical Education

The history of Physical Education in the school curriculum has been fraught with _tension and conflict‘ (Clarke, 2007, p. 11). These struggles have been concerned not only with the status of the subject within the curriculum, but also with what content is considered worthwhile knowledge in an examinable academic subject.

It is a common belief that the importance attached to individual school subjects is largely dependent on what society deems to be important knowledge at that point in history (Clarke, 2007; Davis, 2006; Evans & Davis, 2006). Furthermore it is well documented that Physical Education has traditionally been viewed as a low status subject area (Capel, 2007; Clarke, 2007; Evans & Davis, 2006; Gore et al., 2008; Halbert & MacPhail, 2010; Smith & Parr, 2007; Stolz, 2010). Historically the discipline of physical education has struggled for legitimacy at most, if not all, education levels due to the fact the subject is often considered to be a —trivial pursuit” compared to other areas perceived to be more academically worthwhile (Stolz, 2010, p. 1). It is only in the last 30 years that the study of —the body” has become a _fashionable, respectable element of scholarship‘ (Evans & Davis, 2006, p. 119). In particular, the way in which knowledge is _produced, transmitted and

received‘ in and through Physical Education became a particular research interest (Evans & Davis, 2006, p. 110).

As is the case with most subjects, Physical Education has not been stagnant, and there have been significant changes in what is considered to be ‘Physical Education‘ throughout history (Phillips & Roper, 2006). One of the most significant developments for the subject in recent years is the emergence and consolidation of examinable forms of Physical Education (Gore et al., 2008; Green, 2004; Macdonald et al., 1999) which has seen the subject change from one based almost solely on physical activity to one which incorporates theoretical aspects related to human movement. This shift in the content delivered in Physical Education has led to the subject, in its many guises, becoming an examinable subject at the highest level in many countries around the world (Gore et al., 2008, p. 1).

One major change leading to the emergence of the examinable Physical Education subjects was the so-called ‘scientisation” of the subject which, as Phillips and Roper (2006) explain, placed increased emphasis on the scientific aspects of movement (biomechanics, exercise physiology, sport psychology and motor learning). By focusing on the bodily practices and aligning itself with the academically valued human sciences, Physical Education was able to become an examinable subject at the post-compulsory level (Clarke, 2007, p. 12). While this scientific functionalist approach facilitated an increase in the academic status of the subject it also marginalised the social and historical dimensions of Physical Education (Clarke, 2007; Culpan & Bruce, 2007; Phillips & Roper, 2006). This was criticised by Physical Education researchers for diluting Physical Education to a subject concerned only with mechanical physical activity experiences and ignoring the socio-critical factors which are inextricably linked to those experiences (Culpan & Bruce, 2007). However changes in social, cultural and political circumstances, and more specifically the emergence of a culture which placed more emphasis on the ‘individual‘ in society, have led to these areas of Physical Education regaining status in the academic community (Evans & Davis, 2006). In particular there has been an

increased interest regarding the role Physical Education can play in the holistic education of individuals.

The nature of Physical Education in Australia in particular was changed significantly as a result of government led educational reform in the late 1980's (Brooker & Clennett, 2006; Clarke, 2007). In 1989 the Australian Education Council released a declaration stating that all school subjects would be reconceptualised into eight Key Learning Areas (KLAs), one of which would be *Health and Physical Education*[6] *(HPE)* (AEC, 1989 cited in Clarke, 2007). A significant feature of the newly formed HPE key learning area was that it marked the amalgamation of previously separate curriculum topics which had traditionally been delivered across different subjects (Brooker & Clennett, 2006, p. 7). Health and Physical Education teachers were now responsible for the delivery of content that had previously been part of the curriculum of other subjects like Health, Home Economics, Science, Human Relationships Education and Religious Education (Brooker & Clennett, 2006). Across the Australian states the KLA also served to link previously separate subjects ranging from the integrated Health and Physical Education subject to Health Education and Physical Education under one discrete subject category (Clarke, 2007).

The introduction of the new HPE key learning area also had a significant impact on the format of the syllabuses of the examinable forms of Physical Education in Australia. The KLA framework provided an impetus for curriculum reform across the Australian states and led to the creation of syllabus documents that incorporated content knowledge from a range of subject areas including health, biomechanics, sex education, sports medicine, fitness, leisure, nutrition and sport and games (Brooker & Clennett, 2006; Clarke, 2007). The first stage 6 PDHPE[7] subject in

[6] The Key Learning Area was initially named *Health* in the original document but was later changed to *Health and Physical Education* in 1993 following lobbying by key interest groups (Clarke, 2007, p. 12).
[7] PDHPE combines Personal Development with Health and Physical Education in the NSW curriculum to provide an integrated area of study that provides for the intellectual, social, emotional, physical and spiritual development of students (NSW Board of Studies, 2009, p. 9).

NSW was released in 1990 for implementation with Year 11 in 1991 however as Clarke (2007, p. 15) reports a lack of _critical pedagogical literature‘ about health led to the syllabus adopting a predominantly biophysical based view of health. Whilst there was one elective unit within the syllabus that specifically addressed health from a non-biophysical perspective, *Community Health Issues*, it was the least preferred option chosen by HSC candidates (Clarke, 2007, p. 15).

Further curriculum reforms to syllabuses in the late 1990‘s in Australia led to changes in both the way Physical Education was taught, and what content was included in the subject (Clarke, 2007). One example provided in the literature is the introduction of the new NSW Stage 6 PDHPE syllabus in 1999 which for the first time had, as it underlying philosophy, a socio-cultural view of health and physical activity (Clarke, 2007, p. 1). This new philosophy underpinned significant portions of the new syllabus, and unlike its predecessors, it incorporated socio-cultural content as a mandatory core element of the course (Clarke, 2007). In the same year similar shifts towards a sociological perspective also occurred in syllabus documents in Queensland (Senior Physical Education) and New Zealand (Health and Physical Education) (Burrows & Wright, 2004; Cliff, 2007). The adoption of a socio-cultural perspective represented a significant change for school- based Physical Education (Cliff, 2007). This change in perspective for the subject was explained as:

> *“Developments such as a social view of health, attention to social justice principles, an understanding of young people that moves beyond developmental discourses of deficit and perhaps most importantly, an understanding of knowledge as socially constructed and contestable, offers a considerable challenge to established content, understandings and discourses in HPE.”*
>
> (Cliff, 2007, p. 6)

Another common key element of many of the new syllabus documents was that learning experiences are based on the _integration‘ of physical activity with theoretical concepts. As Hay (2006, p. 319) informs this concept of _integration‘ is

based on the work of Arnold (1985) whose model of learning in, about and through physical activity has formed the basis of many syllabus documents around the world. Davis (2006, p. 13) suggests that by taking a more holistic and integrated approach, and aligning the areas of Health and Physical Education, the link between the two becomes more obvious and relevant to students and therefore providing more meaningful learning experiences. In relating the concept of integration specifically to examinable Physical Education, Hay (2006) uses the example of the current Senior Physical Education syllabus in Queensland, which emphasises the integration of physical activity not only into the learning of tasks but also the assessment of students‘ levels of achievement.

A shift towards formal assessments in Physical Education also began to occur in England in the 1970‘s when members of the profession started to campaign for the subject‘s inclusion in the national examination system (Piotrowski & Capel, 2000, p. 99). With the introduction of the national examination system in England, the opportunity was provided for Physical Education, amongst other things, to improve its marginal status, prevent it from being removed from the curriculum and bring a greater sense of purpose to the subject (Piotrowski & Capel, 2000). Furthermore the inclusion of Physical Education as a foundation subject in the National Curriculum for England and Wales also contributed to the subject becoming examinable.

More recently in Australia, education ministers agreed to the development of a Health and Physical Education subject in the National Curriculum (ACARA, 2010). The improving status of the subject and the importance of its inclusion within school curricula is evident in the document *Shape of the Australian Curriculum* released by the Australian Curriculum, Assessment and Reporting Authority. In this report it is stated that the curriculum —iW also enable students to build social and emotional intelligence and nurture student wellbeing through health and physical education in particular” (ACARA, 2010, p. 16). Most recently, (15.3.2012) the draft of the Health and Physical Education, Foundation to Year 10 syllabus has been released for

comment further increasing the status of this area towards a full entitlement of learning for students in Australian Schools (ACARA, 2012). To date the draft syllabus for an examinable Physical Education subject for students in their final two years of schooling is yet to be released.

Growth of Examinable Physical Education

Examinable Physical Education has enjoyed a period of substantial growth over the last few decades around the world (Gore et al., 2008; Green, 2004; Macdonald et al., 1999). However, alongside this growth, a number of challenges and issues for the physical education profession have been documented, including: the changing nature of the subject (Davis, 2006; Macdonald et al., 1999); what counts as worthwhile knowledge (Davis, 2006; Kirk et al., 2006; Penney, 2006b); and, the purpose and nature of examinable physical education in the curriculum (Green, 2004). Further to these issues is the absence of literature relating to the emergence of examinable physical education in international schooling curricula. In particular the implementation of a Physical Education subject into an international curriculum, such as the IB Diploma Programme has not been discussed.

At present there is limited data relating to exactly how widespread examinable Physical Education is throughout the world. According to the second worldwide survey on the situation of PE in schools conducted in 2005, Physical Education is accorded examinable status in 61% of countries worldwide (Hardman, 2008, p. 8). One of the difficulties in obtaining accurate statistics, as Hardman acknowledges in his survey, the term —examinable" was open to interpretation and as such the figure includes countries where —examinable" refers only to fitness testing. Whilst exact statistics are not available, the data presented in this section of the report provides evidence that examinable Physical Education is an area of growth within the school curriculum.

Interestingly, in a review on the growth and development of examinable Physical Education in England, Green (2004) concluded that there is actually little to support

the notion that the rise of examinations in Physical Education has been due to a shift in the philosophy of physical educators towards theory. Instead it was argued that the growth is more adequately understood to be a result of ‗several interrelated processes' including the profession's quest for academic status among other subjects and general trends in education that have placed increased emphasis on the value of examinations (Green, 2004). These findings highlight the need for further research into the place of examinable Physical Education in the curriculum.

Barriers to the Inclusion of Physical Education

Alongside the struggle to be recognised as a worthwhile academic pursuit, a number of other barriers have been identified relating to the inclusion of Physical Education subjects in the school curriculum (Emmel & Penney, 2010; Halbert & MacPhail, 2010; Jenkinson, 2010; MacPhail & Halbert, 2005). Barriers identified include curriculum overcrowding, access to appropriate facilities and availability of resources and equipment.

In a study of the implementation of a revised Physical Education syllabus in Ireland, MacPhail and Halbert (2005) found that one of the largest barriers was the overcrowding of the school curriculum. The competition for curriculum time due to the number of examinable subjects being offered at secondary school level was identified by the study as a challenge for the discipline. Furthermore MacPhail and Halbert's (2005) findings suggested that, in the final two years of secondary schooling, the high stakes nature of examination results posed an even greater threat to the amount of curriculum time allocated to Physical Education. In a discussion relating to the introduction of a National Curriculum in Australia, Emmel and Penny (2010) commented that the competition with other subjects for curriculum time in an already cluttered curriculum was a challenge facing the subject area.

Access to facilities and resources are also cited in the literature as barriers faced in the provision of quality physical education in secondary schools (Jenkinson, 2010).

Whilst it is acknowledged that Jenkinson's (2010) study was not specifically about the Physical Education at post-compulsory level, the findings provide an insight into difficulties faced in delivering the subject. Barriers identified by teachers that impacted on the delivery of quality physical education related predominantly to the additional resources required outside of the regular classroom (Jenkinson, 2010, p. 11). The three highest ranked barriers being access to facilities, appropriate teaching spaces and equipment. These findings highlight challenges relating to the specificity of resources required for provision of physical education.

A useful insight into challenges faced in implementation is also provided by Halbert and MacPhail (2010) in a paper on the dissemination and implementation of revised senior cycle Physical Education syllabus in Ireland. This paper highlighted the need for adequate support to be available for school principals and staff in order to ensure a good working knowledge of the syllabus documents prior to the enactment of the change. In order to achieve this Halbert and MacPhail (2010) suggest the need for the creation of professional learning communities and the provision of professional development focusing on pedagogy and planning rather than content.

In summary while the emergence and subsequent rapid growth of examinable Physical Education could be used to suggest that the subject has managed to rid itself of the low status subject tag, there is still little empirical evidence in the literature to suggest this is the case. An apparent void exists in research related to the inclusion of Physical Education as an examinable subject in the curriculum. As Green (2004) suggests, while there is no question that there has been an improvement in the status of Physical Education in the last 20 years, there is still some debate surrounding the value of the examinable form of the subject. Alongside the subject's struggle for academic recognition, several barriers to the inclusion of physical education have been highlighted, most of which relate to specialist equipment and facilities required.

Now that Physical Education has found a place in the school curricula as an examinable subject, a period of consolidation is needed. In order for this to occur continued recognition of the subject as an academically worthwhile pursuit and ongoing development of the quality physical education subjects for students in the senior years of schooling in both national and international curricula is desirable. The decision to introduce Sports, Exercise and Health Science as an IB Diploma Programme subject reflects the fact that there has been an improvement in the status of examinable Physical Education and that the subject area is one that is currently in demand. The introduction of SEHS also opens up a myriad of potential research opportunities examining the role of the subject in international education.

INTERNATIONAL SCHOOLING

The development and growth of international schooling worldwide and the growing visibility of these schools within the global educational community has led to an increase in research interest in the area of international schooling (Dolby & Rahman, 2008). This section provides a discussion of the International Baccalaureate Organisation and the International Baccalaureate Diploma Programme, a brief history of the International Baccalaureate Diploma Programme in Australia and concludes with a subsection about the Diploma Programme and tertiary study.

The International Baccalaureate Organisation

In a critical analysis of literature relating to research in international education, Dolby and Rahman (2008, p. 690) noted that the field has explored —a relatively limited number of research agendas" and most literature was —generally focused on what is or is not considered to be international schooling"[8]. Furthermore the authors noted that, to date, research within the field of international education has been predominantly carried out by scholars who hold positions as teachers and administrators in schools affiliated with international schooling organisations (2008,

[8] Dolby and Rahman's (2008) review of literature relating to international education was limited to literature published in English. The authors acknowledge the vast amount of literature unavailable to them as a result of this restriction (Dolby & Rahman, 2008, p. 679)

p. 692). This highlights the possibility that at present a lack of objectivity may exist within international schooling research as those who are conducting the research are doing so from an insider's perspective.

Amongst the rise in popularity of international schooling, the International Baccalaureate Organisation (IBO) has established itself as the "pre-eminent agent of international education" (Drake, 2004, p. 190) offering curriculum programs of international education to over 959,000 students in 141 countries (IBO, 2011a). The International Baccalaureate (IB) was initially developed to provide the increasing number of international schools worldwide with a curriculum program that would be recognised by universities worldwide (Van Oord, 2007, p. 375). In the 40 years since the IBO awarded the first diplomas in 1970, the organisation has experienced a period of rapid expansion, including a remarkable growth of interest in national systems of education (Drake, 2004, p. 190). In this time International Baccalaureate Organisation has also developed programs that cater for students of all ages[9]. Another significant development has been the decision of many schools in western countries to now offer one or more of the IBO's programs as an alternative to local curriculum offerings. This increase in interest in the IB curriculum has led to claims that the Diploma Programme has developed from "a programme for international schools, to an international programme for schools" (Hagoort, 1994, p. 11).

International Baccalaureate Diploma Programme

A review of existing literature relating specifically to the IB Diploma Programme was commissioned by the IBO in 2008 and conducted by a member of their research team, Dr James Cambridge. The review noted that presently "the extent of published literature relating to the Diploma Programme is sparse" (IBO, 2008, p. 2). Further, that IB related research is an 'expanding and developing area of study' and

[9] The International Baccalaureate Organisation now has three programs: Primary Years Programme for learners 3-12 years of age, Middle Years Programme for learners from 11-16 years of age and the Diploma Programme for learners from 16-19 years of age.

one which will undoubtedly attract continuing research interest as the organisation continues to grow (IBO, 2008, p. 2). The review also highlighted the fact that many of the previous studies conducted into the IB Diploma Programme have been conducted for strategic purposes and as such researchers have often failed to consider alternative explanations to detail the outcomes of their studies. In doing this, these studies have opened themselves up for criticism in terms of the trustworthiness of their findings. This is highlighted in the discussion section of the document.

> *"A variety of positions may be identified in the research discourse with respect to the IB Diploma Programme. Some sources may be described as being hortatory. That is to say, they strongly support the IB Diploma Programme and advocate its implementation in schools… A problem with such sources is that they can sometimes be highly selective in how they treat data and research methodologies. For example, research studies may set out to prove a specific position without reviewing alternative explanatory theories that may account for observations."*
>
> (IBO, 2008, p. 22)

These findings provide further support for the need for rigorous research into the many facets of the IB Diploma Programme.

The International Baccalaureate Diploma Programme in Australia

The history of the IB Diploma Programme in Australia has been usefully summarised by Nigel Bagnell (2005). The IB Diploma Programme was first offered at Narrabundah College, Canberra in 1979 (Bagnall, 2005, p. 116) and at the time, the primary reason for the introduction of the program was the need to cater for the large number of international students living in the Australian Capital. The capital is the location of all foreign embassies, numerous government departments and agencies as well as Australian National University. A similar situation arose at another public school in Adelaide at Glenunga High School, (now called Glenunga

International High School), where the school was influenced to offer the IB Diploma Programme so that the children of a Swedish firm, establishing a business in the area, could re-enter university in the Swedish system upon their return. From the information cited in Bagnall (2005) it is evident that IB Diploma Programme was initially introduced into Australia in order to cater for the needs of students who required an _international' education for a globally mobile population. More recent literature however, suggests that there has been a shift in the reasoning for offering an international program of study like the IB Diploma Programme (Doherty, 2009; Drake, 2004; Hagoort, 1994).

The IB Diploma Programme in now offered in 62 Australian secondary schools (IBO, 2011b), many of which offer the program to students as an alternative to the local curriculum (Doherty, 2009). The majority of these schools exist within the private sector and there is growing interest as to what reasons schools might have for offering the Diploma Program as part of their curriculum. To date only limited research has been conducted into the reasons why Australian schools are opting to offer the IB curriculum alongside, or independent of, state curriculums.

_Increasing global flows of students, information and ideas, the realities of globalisation, and an increasingly interdependent world have meant that many educators see the need to internationalise the curriculum' (Tudball, 2005, p. 10). With this in mind, a logical explanation for the increasing number of schools offering the IB Diploma Program is to suggest that the growth has come about as a result of globalisation and the increasing need to offer a curriculum to meet the needs of a globally mobile population. The mission statement of the IBO is a useful place to start looking at how their programs cater for this need:

> *"The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect. To this end the organization works with schools, governments*

and international organizations to develop challenging programmes of international education and rigorous assessment. These programmes encourage students across the world to become active, compassionate and lifelong learners who understand that other people, with their differences, can also be right".

(IBO, 2011c)

The IBO mission statement suggests that in offering the IB Diploma Programme, schools can provide their students with a program of study that will help to educate them to become global citizens. Sobulis (2005) provides evidence to support this claim through an examination of the philosophical foundations of the IB curriculum. Soublis (2005, p. 3) defines the IB approach to education as a _liberal education' and illustrates how this approach leads students to becoming rational thinkers able to make sense of the world.

The rise in popularity of the IBO's courses in recent years suggests that the provision of an international education has become increasing desirable within schools. According to Van Oord (2007, p. 387), the IBO claim their programs _foster international understanding, even in national schools without an international staff and student body'. It should be noted that to date this claim is not supported by research and that, at present, the few studies that are available in this area suggest environment plays a larger role in fostering international understanding than a curriculum program (Van Oord, 2007, p. 387).

IB Diploma Programme and Tertiary Study

A belief that the IB Diploma Programme is an academically demanding course of study that better prepares students for university is a further suggestion for schools making the choice to offer it within their curriculum. This suggestion is supported by Coates, Rosicka and MacMahon-Ball (2007) who in a study of the perceptions of university representatives concluded that those who had knowledge of the Diploma Programme were highly supportive of the qualification. A comparative study of three senior secondary curriculum programs on offer in Victoria, Australia brings

further strength to this claim (McKenzie, 2001). Amongst the findings of the study was the conclusion that of the three, the IB Diploma Programme was considered a surer way of entrance into university courses requiring a high entrance score.

There is of course the possibility that these reasons are not mutually exclusive. The justification for offering an international curricula can be approached from two different directions: a top-down approach considering issues relating to the global and national need for international education and a bottom-up view, that sees programs like the IB diploma as a means of development of the individual, i.e. the student (James, 2005). Looking at the issue from a curriculum content perspective, Tudball (2005) raises the question as to what content should be delivered in an international curriculum, in order to provide students with an ‗international' education. Tudball (2005) suggests that whilst humanities subjects are more likely to include content which naturally include international perspectives, students opt to take subjects which they view as vocationally valuable.

In summary the current dearth in literature relating specifically to IB courses, despite the rapid growth in popularity of international schooling in recent years, highlights the need for continued research into the area. The available literature also highlights the lack of research originating from outside the international education community. The rise in the popularity of the International Baccalaureate Diploma Programme as curriculum of choice in many schools therefore requires further attention from the research community with concomitant challenges to the trustworthiness of the findings from ―insider" researchers. Suggested reasons thus far for increasing interest in IB Diploma Programme include the need to cater for a globally mobile population, the benefits of an international perspective in the development of individuals, as well as a perceived belief that the Diploma Programme in particular better prepares students for post-schooling options such as university study. The next section provides a discussion on curriculum change and in particular the process by which implementation of a new subject into an existing program of study may occur.

CURRICULUM CHANGE

The focus of this study is to provide an insight into the process of curriculum change through the implementation of SEHS in an Australian secondary school. This section is divided into four sub-sections. The first provides a definition for the term "curriculum" for the purpose of this study. The second discusses causes of curriculum change and the third provides an insight into the curriculum change process and in particular the introduction of new subjects. The final sub-section details current theories relating to the implementation of curriculum change.

Curriculum Defined

It is widely acknowledged that curriculum is socially constructed and that this construction is an ongoing process (Brady & Kennedy, 2003; Jephcote & Davis, 2007; Penney, 2006a; Print, 1993; Smith & Lovat, 1995; Yueh, 2007). The content of the curriculum, that is what students are to learn, is a result of the social, historical, cultural, political and economic structures of the society in which it exists (Brady & Kennedy, 2003; Yueh, 2007). In other words, the curriculum is a construct of culture and its content reflects the nature of that culture (Print, 1993). Given this, continual curriculum change is inevitable, as societal values and opinions invariably shift with time. This gives rise to the question that, if change is an inevitable outcome of the socially constructed nature of curriculum, what factors lead to change and how does change occur?

Providing a clear definition of curriculum is a complex task. There are numerous definitions provided in the literature with different authors using the word in different ways depending on the context in which 'curriculum' is being discussed (Brady & Kennedy, 2003; Marsh & Willis, 2007; Stinson, 2007; Yueh, 2007). Smith and Lovat (1995, p. 7) sum it up well when they explain that, just like the words 'happiness' or 'love', the word curriculum means different things to different people and for that reason no one definition should be seen as a definitive. Instead they advocate that it is far more important to acknowledge the multiplicity of meanings of the term in order to appreciate its use in more specific contexts. In other words, in

acknowledging that curriculum has no single correct definition, it is possible to understand the meaning being given to the word when it is used.

Multiple definitions and views on what constitutes a curriculum illustrate how, depending on the perspective of the author, the term _curriculum' can be used to describe everything from formal subject documents developed by governments or educational authorities, through to the interactions between teachers and students in the classroom. The following examples provide a range of different definitions or meanings offered for curriculum in the literature. The first 3 refer to curriculum as a school based term, explaining it to mean the content students study at school. The fourth definition introduces curriculum as being affected by multifaceted external factors. Definitions five and six propose an outcome focused meaning for the term while the final definition acknowledges the term to be one that may be subject to individual interpretation.

> *"[Curriculum is] an interrelated set of plans and experiences that a student takes under the guidance of the school"* (Marsh & Willis, 2007, p. 10)

> *"The curriculum is a syllabus, a course of study or subjects"* (Smith & Lovat, 1995, p. 10)

> *"[Curriculum is] the official knowledge that schools advertise and sanction as part of their courses of study"* (Ladson-Billings & Brown, 2008, p. 154)

> *"[Curriculum is] a school plan which is affected by social, economic, historical, cultural and political dimensions"* (Yueh, 2007, p. 39)

> *"[Curriculum is] the knowledge, skills and (sometimes) feelings that educators want their students to acquire."* (Popham, 2008, p. 203)

> *"…curriculum is defined as an official statement of what students are expected to know and be able to do."* (Levin, 2008, p. 8)

> *"Some claim that a curriculum is the content or objectives for which schools hold students accountable. Others claim that a curriculum is the set of instructional strategies teachers plan to use." (*Posner 1995, p. 5, cited in Brady & Kennedy, 2003)

Rather than accepting any one definition as a _correct' or preferred explanation for the term, this reviewer acknowledges the multitude of meanings and their importance in viewing curriculum as a process rather than a product. Whilst this is acknowledged, the word curriculum will be used in this study to refer to a program of study consisting of written subject syllabus documents that are developed through collaboration and implemented by government and educational authorities. The purpose of this definition is not to discount the important role played by teachers in the planning and delivery of content (Brady & Kennedy, 2003; Smith & Lovat, 1995). Instead it is intended that this definition is used to provide a context for discussion. More specifically using this definition will allow for an examination of the factors that act to initiate curriculum change, and how these changes occur in terms of the development and implementation of syllabus documents by governments and educational authorities into schools.

The development of school curriculum typically occurs as a result of an identified need for some type of change to that curriculum. As such it is important to understand the factors that may act as antecedents for this change. Of particular interest are the factors that contribute to the introduction of new subjects into existing programs of study or significant changes to existing subject documents.

Causes of Curriculum Change

The content of the school curriculum, that is, what subjects are to be taught or what students are to learn, has long been a topic of public interest and debate (Levin, 2008, p. 8). As mentioned in the introduction it is widely accepted that the formal school curriculum is a construct of the society in which it exists. Therefore as the opinions, values and beliefs of society shift with time, curriculum change is inevitable. In accepting a social constructivist view of curriculum, the school curriculum can be understood to be a product of ongoing struggles between a variety of agents, groups and individuals' (Jephcote & Davis, 2007, p. 207). Brady and Kennedy (2003) explain these 'agents, groups and individuals' to be the curriculum stakeholders who have a specific interest in the outcome of the change. Those considered to be the stakeholders include government, the business community, universities and schools, teachers, parents and of course the learners (Brady & Kennedy, 2003).

Widespread curriculum change is inextricably linked to politics. As Levin (2008) explains, the government or sanctioned educational authorities are responsible for the development of the official school curriculum and these decisions about the curriculum are governed by educational policies. Furthermore these policies are often political decisions made by governments in response to a problem or need within society (Lee, 2001; Levin, 2008). For example, governments in many parts of the world are showing an increasing interest in the role that the content of the school curriculum can have as an instrument for social and economic development (Brady & Kennedy, 2003; Lee, 2001; Print & Veldhuis, 2002). A study by Lee (2001) of government controlled educational policy reforms provided the example, among others, of how concern about low academic standards and poor student achievement in England led to the introduction of a national curriculum for schools.

A study into the introduction of Citizenship Education provides a further example of the influence of government in curriculum change (Print & Veldhuis, 2002) by explaining how the subject was introduced into the school curriculum in the wake of

societal demand for the subject. According to Print and Veldhuis (2002) many Western governments recognised the importance of the school curriculum in shaping the views of young people and as such saw the introduction of Citizenship Education as a means of educating students about the importance of democracy and democratic citizenship. Brady and Kennedy (2003) also explain how in recent years governments have focused heavily on the role that curriculum can play in economic development of their country. Many government led educational reforms in the traditional western industrialised countries have been aimed at the development of a more highly skilled and adaptable workforce (Brady & Kennedy, 2003, p. 47). Curriculum change is therefore driven by the need to produce individuals with adaptable skills, and this is in part due to many countries viewing their economic futures as relying more heavily on an increasingly knowledge-based economy.

It is important at this stage to acknowledge the fact that public opinion often drives politics and consequently is a major force behind curriculum change. Educational policy and resultant curriculum change is reflected in what politicians understand by the views of society or the voters (Levin, 2008, p. 9). Arguably, to stay in power governments need to do what the public wants and as such educational stakeholders have varying degrees of influence over curriculum decisions. These stakeholders (the business community, universities and schools, teachers, parents and students) all have an interest in what content is included in the school curriculum and as such can play a role in initiating change.

The business community in particular have become increasingly aware of the role that the school curriculum plays in preparing young people for employment and are now interested more than ever in what content is being delivered to students in schools (Brady & Kennedy, 2003, p. 4). Universities also have shown significant interest in the skills of secondary school leavers. (Brady & Kennedy, 2003; Levin, 2008). Levin (2008, p. 20) provides the example of how the removal of calculus from the senior Mathematics syllabus in Ontario, Canada was met with objection

from both high tech industry leaders as well as members of an engineering and physics university faculty. As a result of their objection, the Ministry of Education in Canada was forced to commission a curriculum review committee, made up of representatives from the various stakeholders, to examine the issue. The result was a compromise that would preserve calculus within the Mathematics syllabus in a new form. This example demonstrates the level of the influence that the broader community can exert on politically instigated changes in curriculum.

Teachers and education professionals may also act as instigators of change. On the level of syllabus document development, teachers have far less influence over the change process than the obvious influence they have on the decision making at classroom level (Kelly, 1989, p. 17). However teachers and schools are typically included in the development of subject documents through representation on planning committees responsible for the formulation of subject syllabi (Brady & Kennedy, 2003; Print, 1993). This is not to say that teachers cannot themselves play a significant role in affecting change. Green (2004) provided the example of the introduction of examinable physical education in the United Kingdom to explain how professionals from within the physical education subject community, through concerted effort, were able to successfully lobby for its inclusion into the curricula.

Finally, parents and learners also have the ability to affect change concerning the content of the school curriculum. As already mentioned, the influence of public opinion on government policies provides parent and community groups a platform on which to effect change. However as Marsh and Willis (2007) explain, parent groups are often provided with a voice through their involvement in curriculum advisory committees. This however, only occurs in models of change that provide room for such input. Brady and Kennedy (2003, p. 19) cite an example of the NSW Board of Studies syllabus development committees which incorporate representatives from each of the stakeholder groups including two appointed nominees representing the interests of Parents and Citizens associations.

Process of Curriculum Change

Smith and Lovat (1995) suggest that —In some sense all curriculum work is about change" and that —from this perspective, any curriculum planning, development implementation or evaluation is a change process" (p. 202). The development and subsequent introduction of a new subject into an existing curriculum typically follows a well-developed formal process of change dictated by the educational jurisdiction responsible for that curriculum (Levin, 2008). However, it is also well documented that any curriculum change is a complex and gradual process (Brady & Kennedy, 2003; Fullan, 2007; Ryan, 2006) and that it is a process that inevitably involves conflict (Fullan, 2007; Levin, 2008; Smith & Lovat, 1995).

Curriculum change is a broad term that refers to a range of concepts including innovation, development and adoption (Marsh & Willis, 1999, 2007). Whilst there are various models of how curriculum change can occur, (Fullan, 2007) suggests that the process of change can be simplified into three broad overlapping phases shown in Figure 2.1.

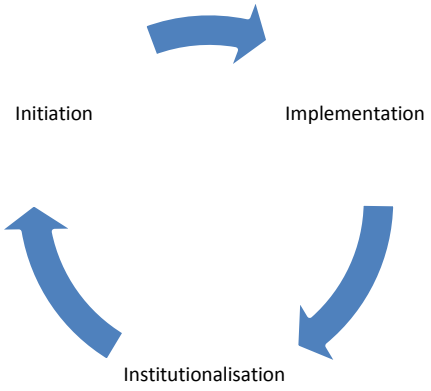

Figure 2.1. Model of curriculum change (Fullan 2001)

According to Fullan's (2007) model, curriculum change typically involves the recognition of the need for the subject and the development of a syllabus document for the subject (initiation), the piloting of the subject within the school setting (implementation), and finally the widespread adoption of the subject following a

period of evaluation (institutionalisation). Fullan (2007, p. 50) also emphasises that this is not a linear process, rather the three phases are to be considered as dynamic and fluid whereby developments at any one stage may be used to modify decisions made at previous stages and/or subsequent ones.

Following Fullan's model of change, recognition of the need for the inclusion of a new subject, is followed by the initiation phase in which the new syllabus document is developed. In terms of the introduction of a new subject, the process typically involves the government department or organisation responsible for the development of the curriculum bringing together a group of subject experts and representatives of the other stakeholder groups to draft together elements for the new curriculum document (Levin, 2008). In the case of the introduction of SEHS, the International Baccalaureate Organisation is the educational authority responsible for syllabus construction and implementation into schools all over the world. The introduction of SEHS in a small number of pilot schools provides an example of how changes to the IB curriculum move from the initiation phase to the implementation phase.

Implementation of Curriculum Change

Yueh (2007, p. 53) suggests that curriculum implementation can be considered as —doing something new, or different, from what was done in the past". Following the development of a draft syllabus document, a process of piloting or trialling of the syllabus often takes place. Implementation is the second step in Fullan's (2007) model refers to this as the second step of the change process, known as implementation.

Implementation is a relatively new term in educational research which came about as a result of the realisation that many of the curriculum innovations of the 1960's were not finding their way into the classroom (Fullan, 2008, p. 113). One of the most significant challenges faced by curriculum innovators is that the written documents they produce can only outline what is intended (Smith & Lovat, 1995;

Westbury, 2008). In reality there are often vast differences between what syllabus writers intend and what actually happens in the classroom. Formal curriculum documents are a text which must be interpreted by its users and as such it is inevitable that it may be read and understood in different ways depending on the reader and their situation (Westbury, 2008, p. 50). Cohen, Raudenbush and Ball (2003) explain that curriculum documents can be considered as being a ‗resource' whose success depends upon the ability of its users to effectively implement it. This claim is supported by citing past research that demonstrates that schools and teachers, given the same resource, will ―do different things with different [learning] results" (Cohen et al., 2003, p. 119).

In theorising about implementation, Fullan (2007) identified three groups of factors that affect implementation as being:

- Characteristics of the change (the relevance and need of the change, clarity and complexity of the change, and the quality and practicality of the program);
- Local factors (characteristics of those directly involved in the implementation, e.g. teachers, coordinators, principals); and,
- External factors (e.g. parents and community, business, government policy, wider teaching profession).

Effectively, Fullan's (2007) model acknowledges that: any curriculum change has to be needed and clearly understood; the site at which the change occurs needs to be able to facilitate the change; and, that the success of the change is influenced by factors outside the site of the change.

In examining curriculum implementation it is also important to consider both the content and the process of the change (Smith & Lovat, 1995, p. 202). Whilst the content of the change is usually quite explicit through the written syllabus document, the actual process by which to implement the change typically is not (Altrichter, 2005). Implementation of a new subject requires the consideration of a range of issues including available resources, reason for change, time and monetary cost,

timetabling and staffing issues, teaching-learning structures, community support and professional development needs of teachers (Altrichter, 2005; Brady, 1995; Buchanan & Engebretson, 2009; Fullan, 2007; Halbert & MacPhail, 2010; Macdonald, 2003; MacPhail & Halbert, 2005). For example, Brady (1995, p. 175) suggests that a curriculum is unlikely to be successfully implemented if there are insufficient resources (materials, equipment, facilities or people) to support the change.

It is well recognised in the literature that successful implementation of change is largely dependent on those responsible for managing the change at school level having initially understood the reason for the change (Brady, 1995; Buchanan & Engebretson, 2009; Macdonald, 2003). In studying the implementation of a new approach to Religious Education in New South Wales, Buchanan and Engebretson (2009) found that change was only successful if those implementing the change at school level had a theoretical understanding of reason for the change. Furthermore their study found that the most resistance to change came from a misunderstanding of the theoretical reasons behind the change as opposed to the actual change itself.

Professional development for teaching staff can also assist in facilitating the implementation of lasting curriculum change (Brady, 1995, p. 180). Any curriculum change requires staff to gain some degree of new expertise and curriculum change often fails due to an underestimation of the need for professional support for staff (Altrichter, 2005, p. 50). Often this issue is addressed with a one off in-service day, however, studies cited by Altrichter (2005) and Brady (1995) suggest that continuous professional development is necessary both before and during the implementation process if the change is to be successful. A study into the implementation of a revised Senior Physical Education syllabus in Queensland found implementation was less successful where teachers felt they received inadequate in-service training (Reddan, 2006). Findings of the study suggested that there was a common consensus amongst teachers that more lead-in time was needed to absorb the implications that the syllabus would have on their teaching

practices (Reddan, 2006, p. 18). Similar findings were found by Yueh (2007) who concluded that a lack of professional development affects the likelihood of successful implementation of a new subject.

Another issue for schools is the cost involved with curriculum change, particularly in relation to the resource provision within schools (Brady, 1995). It was also evident in the literature that costs related to staffing and timetabling of subjects can also affect implementation (Fullan, 2007; MacPhail & Halbert, 2005). In this regard, the support of those in charge of curriculum decisions at school level is very important. Fullan (2007) suggests that the quality of the innovation and the method of implementation are also factors influencing the success of curriculum change. This implies that if a subject is to be successfully introduced it needs to be seen as a worthwhile addition to the curriculum. Support for the subject from government, schools and community groups, can increase the likelihood of its success (Fullan, 2007). In order for the implementation to be successful the rewards of introduction of the change need to outweigh the costs to the school, and if this doesn‘t happen, there is likely to be resistance to the change.

In an investigation of implementation of change in a rural school setting Miller et al. (2011) adopted a model suggested by Cawsey (Anderson and Cawsey, 2008) in order to examine the success of an intervention program aimed at changing adolescent girls‘ activity levels. Miller, Puglisi and Perry (2011) applied six criteria to assess the degree to which initial intentions moved towards a sustained change in practice. The following six criteria were applied to the change in the schools to examine the extent to which:

- issues management moved to ideas management
- activity and structure moved to strategy and process to values
- making change in practice moved to making change with people
- initiating (outside-in), to sustaining (inside-out)
- imposed (regulated) to embedded (educated); and,

- the project outcomes were transcended to become valued student leaning outcomes

(Miller et al., 2011, p. 6)

In applying the criteria to a case study of a rural school setting, Miller et al. (2011) were able to identify specific issues within the school environment that affected intervention strategies from becoming institutionalised practice.

Another emerging theoretical model for implementation has been proposed by Rogan and Grayson (2003) who developed three constructs located at the centre of curriculum implementation; *Profile of Implementation, Capacity to Innovate,* and *Outside Support*. Rogan and Grayson (2003, p. 1180) explain that their constructs share three important characteristics: –i(they can be measured by means of indicators (ii) they are broad enough to encompass a number of related factors and (iii) they are narrow enough to include one main idea." Rogan and Grayson (2003) also explain that the three constructs were developed in an attempt to acknowledge the inevitable range of diversity that exists between individual schools and the non-linear way in which curriculum change occurs. It is also proposed that the constructs are interrelated, a concept which supports theories relating to the dynamic nature of curriculum development. These constructs are defined in Figure 2.2, a model adapted from Rogan and Grayson (2003);

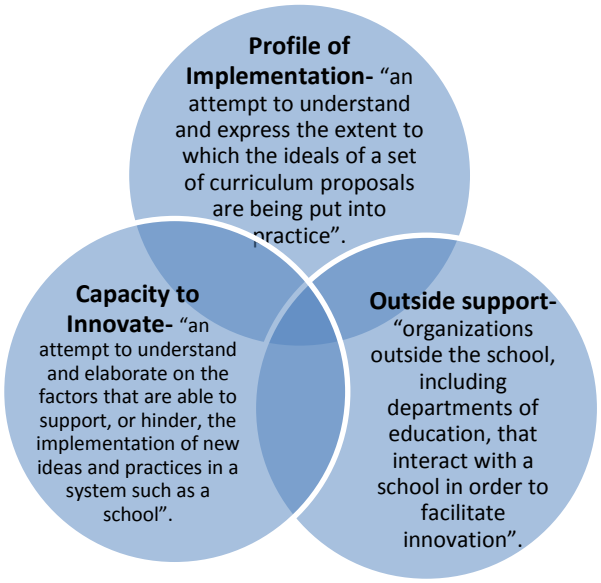

Figure 2.2. Model adapted from Rogan and Grayson's (2003) constructs of curriculum innovation

Within each of the constructs Rogan and Grayson (2003) suggest a range of factors or 'indicators' exist that can be used to assess or measure curriculum implementation. The manner in which indicators for each of the constructs affect implementation are discussed in the context of the implementation of a natural science learning area in the South African curriculum. More specifically, indicators allow for the measurement of those differences that exist due to the unique nature of individual school settings which invariably affect the process of implementation. Rogan and Grayson (2003) conclude their study by acknowledging the emerging nature of their theory and suggest that more research in a variety of contexts is needed to identify other possible indicators for each of the constructs and to establish the existence of the nature of the relationships between the constructs.

As illustrated in this section, curriculum change is a dynamic, multifaceted and complex process. Three models of change have been presented. The Fullan model encapsulates the three comprehensive stages of curriculum reform. These include curriculum initiation, implementation and institutionalisation. The Cawsey

model has six criteria across which change is tracked from multiple perspectives of outside to inside schools, by whom and how. The time-series focus is long-term, similarly reflecting elements of the Fullan model. The Rogan and Grayson model is predominately focused on the implementation phase of curriculum change. In order for curriculum change, and in particular curriculum implementation, to be successful an understanding of how this process occurs is important. Successful curriculum implementation such as the introduction of a new subject into an existing program of study is reliant on a number of factors including; an understanding of and a need for the change, the schools ability to implement the change and the provision of support during implementation.

SUMMARY

Despite challenges, Physical Education as a subject area has experienced a period of significant growth with it now, in its many guises, being an examinable subject available to students in their final years of secondary schooling in many parts of the world. Until recently, although it has been offered in state or national curriculums for the last few decades, there has been no examinable form of Physical Education for students studying at schools offering international curriculum programs, such as those offered by the International Baccalaureate Organisation.

In recent years there has been a marked rise in the popularity of international education and in particular, schools offering the International Baccalaureate Diploma Programme. It is becoming increasingly evident that schools are no longer offering courses like the Diploma Programme merely to meet the needs of international students, instead opting for it as an alternative in favour of local curricula. As a result of this growth the International Baccalaureate Organisation has recognised the need to introduce new subjects into the Diploma Programme. The piloting of Sports, Exercise and Health Sciences in fourteen schools worldwide is significant as it marks the first time an examinable Physical Education subject has been offered within an international curriculum and provides an opportunity to investigate the implementation of this curriculum change. Three models of

educational curriculum change have been described. Each provides various lenses on the process of change, with the major differences being on the level of focus on each stage and the amount of time that change can be observed in order to be adopted and institutionalised in the school settings.

CHAPTER THREE

METHODOLOGY

This chapter describes and accounts for the methodological processes employed in researching staff and student experiences in the implementation of *Sports, Exercise and Health Science (SEHS)* into the International Baccalaureate Diploma Programme at one Australian secondary school. The research was primarily concerned with examining the process of this curriculum change from the perspective of the participants and it aimed to: develop an understanding of the purpose/s of SEHS from the perspective of those involved in the implementation; develop an understanding of factors that had affected the implementation of SEHS at the research site; and, identify potential issues or challenges that may be faced by other schools looking to implement SEHS into their curriculum. In order to explore the processes of implementation of new curriculum to the case study school, the conceptual framework framing the investigation has taken up the call of Rogan and Grayson, to test their model in new and varied contexts. More specifically, this investigation was designed to answer the following research questions.

Research Theme. What is the alignment between the conceptual framework for curriculum implementation (Rogan & Grayson, 2003), and the processes of implementation of the SEHS at the research site?

> Research Question 1. From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Profile of Implementation?

Research Question 2. From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Capacity to Innovate?

Research Question 3. From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Outside Supports?

Research Question 4. Based on the experience of piloting of SEHS curriculum what advice would the participants at the research site provide to other schools contemplating enacting SEHS?

This chapter is organised into four main sections. The first provides a justification for the design of the research. The second provides a description of the procedures used to conduct the study. The third section evaluates the research design by addressing issues related to trustworthiness in qualitative research. Finally the fourth section provides a summary of the chapter.

RESEARCH DESIGN

This investigation employed a qualitative interpretivist method of inquiry in which a single case was examined in order to explore in depth the issues faced by those involved in the implementation of SEHS at the research site. This section of the chapter describes: the rationale for selecting a qualitative approach, the conceptual framework, and the case study approach.

Rationale for the Selection of a Qualitative Approach

Qualitative research is used when a researcher begins with an intention to explore phenomena, and then through the collection of data, generate ideas or hypotheses (Greenhalgh & Taylor, 1997, p. 740). Creswell (1998, p. 15) explains that in adopting the qualitative approach the researcher is able to analyse words and report in detail the views of participants in order to build a complex, holistic picture of the research issue. As the purpose of this research was to examine the

experiences of those involved in the implementation process in order to provide illumination of potential issues faced in the future implementation of SEHS, the use of the qualitative research approach was appropriate.

The interpretivist paradigm is one which researchers operate within when they believe that meaningful data will be obtained to assist in developing an understanding of the research problem rather than attempting to provide an explanation for it (Bryman, 2008). As the research aim was to understand how implementation was experienced by those directly involved in the process, an interpretive approach was appropriate. The approach also allowed the researcher to develop an understanding of the issues experienced in the implementation process at the research site, through the recording of various participants‘ views on the research issue. This is important as interpretive studies aim to understand —the phenomena of interest from the participant‘s perspective, not the researcher‘s" (Merriam, 1998, p. 6). In order to investigate the complex processes involved at school level in the implementation of a new subject, in this instance SEHS, from an interpretivist perspective, the research design employed a case study approach.

Case Study Research

Case study research allows the researcher to study the research question, in all of its complexity, in the real life situation in which it occurs (Kyburz-Graber, 2004, p. 54). Although case study research is a popular choice of research methodology for social researchers (Creswell, 2007; Gerring, 2004), it is also a method which is often criticised. Gerring (2004, p. 54) suggests that much of the confusion around this methodology relates to the issue of defining what a case study actually is and what purpose this method fulfils in the research community. In light of this, this research adopted Creswell‘s (2007, p. 73) explanation that a case study is a qualitative approach used to investigate a bounded system (or case) over time, through the collection of in-depth detailed data in order to provide a description of that case and case-based themes.

More specifically this project was an in-depth investigation of a single unique case utilising semi-structured interviews as the primary method of data collection. Field notes and subject specific documentation were also collected. In this research, the bounded system or case, which Creswell (2007, p. 73) explains to be a setting or context in which the research problem exists, was an Australian secondary school currently involved in the piloting of the SEHS. The research site is a clearly identifiable case with clear boundaries of a set geographical location with a defined staff and student population.

The uniqueness of this particular case made single case study research an appropriate choice. The research site chosen is one of only fourteen schools worldwide involved in the piloting of SEHS. The issue of generalisability in single case study research is a point of much discussion in the literature (Berg, 2007; Bryman, 2008; Creswell, 2007; Flyvbjerg, 2006; Gerring, 2004; Silverman, 2005; Stake, 2005). However, as Flyvbjerg (2006) explains, depending on how the case is chosen, single case studies can contribute to the understanding of an issue within a broader context. Berg (2007, p. 295) suggests that generalisability is not even a question that need be asked as there is clearly value to be gained from the investigation of a single case. The use of a single unique case for the investigation enabled a consideration of any issues that may arise in future attempts to implement SEHS at other schools to be undertaken.

One of the key characteristics of case study research is that it involves the collection and analysis of data from multiple sources (Baxter & Jack, 2008; Creswell, 2007). In this study, sources of data included students, teachers, coordinator, as well as field notes and subject specific documentation. In case study research data from multiple sources are converged in the analysis process to provide the researcher with a better understanding of the whole phenomena being studied (Baxter & Jack, 2008, p. 554). The convergence of data sources provided further strength to the study as it provided a better understanding of the case in its entirety. A deeper understanding and appreciation of SEHS as a subject was

gained by the researcher through the examination of the SEHS draft syllabus document prior to the interviews taking place. This understanding provided a context in which to interpret participant responses and as such assisted during the interview with the analysis that occurs concurrently with collection in qualitative research studies.

Case study research was therefore viewed as being suitable to the aims of this research as it provided the researcher with the opportunity to examine the key issues relating to the implementation process within a real life situation in which curriculum change was occurring. The intention being, that this examination, when set alongside existing literature, may provide empirical evidence of the issues that could be faced in the widespread introduction of SEHS in other settings. In order to guide the research process, the conceptual framework is now presented to establish the underpinnings of the qualitative, case study approach to this investigation.

Conceptual Framework

Rogan and Grayson‘s (2003) model of implementation (discussed in Chapter Two) provides the conceptual framework for this investigation. This framework was chosen in preference to the Fullan (2007) or the Cawsey (2011) models as these were more concerned with long-term, time-series type of analysis, and focused on the degree to which curriculum change was adopted and embedded into the school culture. As such, the Rogan and Grayson model was the most applicable for this research due to the alignment with the implementation phase of curriculum change in a school. More specifically, Rogan and Grayson (2003) called for their theoretical model to be tested in a different context to the South African school system. Therefore, the structure of the implementation model; more specifically the three constructs namely; *Profile of Implementation, Capacity to Innovate and Outside Support* presented as aligned elements from which to research the one case study school, piloting SEHS curriculum in an IB Diploma. Not only is this model

ecologically valid in terms of context and purpose, but the model can be trialled in a new cultural context. For these reasons, Rogan and Grayson's (2003) model provided the conceptual framework for this research and was adopted to inform the construction of interview questions and to frame the presentation of the results.

In summary, this section has outlined the rationale for the adoption of the qualitative paradigm in this investigation. The use of case study research provides an appropriate approach through which to investigate the processes of curriculum implementation of SEHS to an IB School. The conceptual framework was adopted in response to both the call of Rogan and Grayson to apply their model to varied contexts and the alignment between their model and the stage of change implementation at the research site.

PROCEDURES

This section of the chapter provides a description of the geographical setting, phases of the study, the participants, development of the instruments, and the methods employed to collect and analyse the data.

Geographical Setting

The research site for the investigation was an all boys secondary school in the inner western suburbs of Sydney, Australia. The school is an independent[10] school that offers its students in their final two years of schooling the choice between studying the IB Diploma Programme or the NSW Higher School Certificate. The site was chosen on account of its uniqueness, as it was one of only fourteen schools worldwide involved in the piloting of the SEHS subject. This particular site was also chosen for convenience, as, due to time and budget constraints, it was the most accessible to the researcher. Initial access to the site was granted following a written expression of interest to conduct research at the school.

[10] In Australia, an Independent school refers to one that is independent in its finances and governance. Independent schools (also commonly known as private schools) do not rely on national or local government funding for financing their operations.

Phases of the Study

Prior to any procedures taking place ethics approval was sought and granted by the University of New England Ethics Committee, Committee Approval Number: HE10/132 (Appendix A). Conditions of the UNE ethics committee were met in full. Ethical considerations for this project included the age of participants taking part in the investigation, gaining informed consent from participants and issues relating to guaranteeing and preserving confidentiality.

Informed consent was sought by the researcher in order to ensure that the ethical norms of *voluntary participation* and no *harm to participants* were met (Babbie, 2007, p. 64). Participants were provided with a plain language statement (Appendix B) in order to ensure they were fully aware of the aims of the study and subsequently provided with an informed consent form (Appendix C) to sign prior to participating. Participants under the age of 18 were provided with a simplified plain language statement (Appendix D) and an informed consent form which required the signature of a parent/guardian (Appendix E). Verbal consent was also requested and recorded at the beginning of each interview.

Participation in the study was voluntary and participants were free to withdraw their consent at any stage without penalty. The names of both the research site and participants were replaced with pseudonyms for confidentiality purposes.

Participants

Participants for the investigation were selected using purposive sampling, a non-probability method. This method is often used in qualitative research (Devers & Frankel, 2000) as it allows for the selection of individuals from specific groups within a research site who are likely to provide meaningful data. Participants for this investigation were selected to provide a cross section of those with experiences of the implementation of SEHS at the site. Seven participants included:

- School executive: The Coordinator of the IB Diploma Programme at the school (n=1)
- Current staff members: A teacher involved in the piloting since its introduction and a teacher who had just begun teaching the SEHS subject (n=2)
- Current students: Three students currently studying SEHS (n=3)
- Past student: A student from the initial cohort to pilot SEHS (n=1)

Following approval from the UNE ethics committee, contact was made with the school via telephone. After this initial contact, an email outlining the nature and purpose of the investigation was sent to the school. Once the school executive provided confirmation of the school's willingness, to be involved in the study, individual participants were contacted and arrangements were made for interviews to occur at a mutually agreed time and place. All seven interviews were conducted by the researcher at the research site. The next sub-section provides a detailed description of the development of the research instrument.

Research Instrument Construction

Semi-structured interviewing was chosen as the primary method of data collection for the investigation. An integral part of this method is the creation of an interview guide. The interview guide was used to provide structure and consistency during the data collection process. Whilst the interviewer is considered to be the primary research tool, the guide was used to provide a link between the research problem, past relevant literature and the sought after data the researcher is trying to obtain (Krauss et al., 2009, p. 246). For this investigation the construction of the interview guide was an iterative process involving the researcher and the supervisory team.

The process of constructing the interview guide occurred concurrently with the design of the study and, as mentioned, involved frequent consultation with a team of supervisors with experience in research. This was important as the interview guide is critical to the success of data collection as it dictates what information may be

obtained during the interview. At this point a decision was also made in relation to the consistency of the wording of interview questions. While it was acknowledged that participants had varying levels of involvement and/or experience in the piloting of SEHS, the decision to use the same interview questions for all participant groups was made in order to provide a common point of comparison during data analysis.

The development of the first version of the interview guide was informed by the conceptual framework of the study, the researcher's existing knowledge, as well as a meta-search of literature relating to the IB Diploma Programme in Australia. Kvale (1996) informs that thematically, questions should relate to 'the topic of the interview, the theoretical conceptions at the root of the investigation and to the subsequent analysis' (p. 129). In order to develop questions capable of achieving these criteria, the researcher must have knowledge of the research problem through experience and/or a review of literature (Minichello, Aroni, & Hays, 2008, p. 90).

The first version of the interview guide contained six questions relating to the purpose and the aims of the study. The choice regarding the number of questions to include in the research instrument was informed by literature. Creswell (2007) suggests that for semi-structured interviews, the guide need not contain more than five or six open-ended questions. Any other information obtained can be elicited through the use of probing responses given to those key questions (Krauss et al., 2009; Kvale, 1996; Minichello et al., 2008). The initial version of the guide was used as a starting point for discussion between the researcher and supervisory team, particularly in relation to the construction of valid interview questions. At this stage feedback from supervisors highlighted the need for the questions to be refocused around the conceptual framework of the study and the rewording of questions in order that data collected would more effectively relate to the research questions. To assist the researcher in the rewording of questions, the suggestion was made that the interview guide be reorganised into a matrix that outlined the question, its purpose and how it related to the conceptual framework of the study.

The second version of the interview guide, which utilised the suggested matrix, was met with positive feedback in terms of fitting more closely with the aims of the study. Further suggestions for improvement were made by the supervisors and these were acted upon as well as a small change to one of the questions in order to obtain data that was intended to be more relevant to data the interviewer was trying to collect. At the completion of this stage of the process, this third version of the interview guide was trialled by interviewing a professional colleague with knowledge of the research topic in order to identify any weaknesses that were not yet apparent.

The trialling of the interview guide was an essential step as it highlighted some obvious gaps in the capabilities of the research instrument and allowed the researcher to make changes to both the questions and how they were worded. At this point the literature was also revisited for ideas on how the guide might be improved and possible ideas on how questions might better be phrased. As a result version four was created and again was sent to the supervisory team. This version was very well received and feedback was given on the quality of the revised version. One or two wording issues were addressed and one of the questions was again reworded to be more in line with terminology in the literature that informed the construction of the guide. The final version (Table 3.1) was refined following a trial interview process.

Table 3.1. Final version of the interview guide

INTERVIEW INSTRUMENT **as of 19/10/2010** Note: Version shows development of literature-informed interview guide following a trial interview and further consultation with both the literature and supervisory team		
Conceptual Framework	**Foci of investigation**	**Interview Questions (IQ)** (All participants will be asked the same question)
Opening question	Find out more about the background of the person you are interviewing in context of research site	**IQ1:** **The aim of this study is to examine the piloting of SEHS subject at this school. Given this focus, could you please describe the capacity in which you were involved in the piloting?**
(Questions relate to „what" is to be implemented) **Profile of Implementation-** ~~a~~n attempt to understand and express the extent to which the ideals of a set of curriculum proposals are being put into practice".	Developing an understanding of the purpose of SEHS from the perspective of those involved in the piloting of it.	**IQ2:** **From your point of view, what is the aim of SEHS?** **IQ3:** ***In your view, is there a need for SEHS in the IB diploma program? Why or why not?***
(Questions relate to school based factors that assist or hinder implementation) **Capacity to Innovate-** ~~a~~n attempt to understand and elaborate on the factors that are able to support, or hinder, the implementation of new ideas and practices in a system such as a school".	Developing an understanding of factors that affect the change process during implementation of SEHS at the pilot school	**IQ4:** **What, if any, have been the challenges in the piloting of the SEHS at the school?** Prompts: • What factors have assisted in your school's ability to implement the SEHS syllabus? • What factors have hindered your school's ability to implement the SEHS syllabus?
(Questions relate to the degree of support from outside the school) **Outside support-** ~~o~~rganizations outside the school, including departments of education, that interact with a school in order to facilitate innovation".	Developing an understanding of how outside support might assist in implementation	**IQ5:** **What supports, have you received from outside the school in the process of piloting the subject? How effective have these been?** Possible prompts: • How much guidance was provided by the IBO? • Can you suggest any other support that may have helped in the piloting process?
(Closing questions to bring ideas together)	Developing an understanding of the overall change process as experienced by those involved in the piloting of SEHS	**IQ6:** **From your experience with the piloting of SEHS, what advice would you give other schools wanting to offer the subject?**

The final version (Table 3.1) was completed and it was agreed that this would be the tool used for the study. The development of the research instrument was designed to collect the most reliable data possible. The processes of data collection are now outlined.

Data Collection

Due to the interpretive nature of the investigation, interviewing was the primary method of data collection. In particular, semi-structured interviewing was chosen as the preferred method. As previously mentioned, integral to the success of this method is the creation of an interview guide. The process by which this guide was constructed has been discussed in the previous section. Importantly, the use of a literature informed interview guide allowed for an informed discussion of the implementation of SEHS at the research site to take place. The choice to use interviews was made due to their potential to yield rich data. As Boyce and Neal (2006) explain, interviewing allows the researcher to gather detailed data about participants' thoughts and behaviours and often provides a more complete picture about the issue being investigated.

Seven semi-structured interviews lasting up to 40 minutes each were conducted at the research site over a period of two months. Whilst each participant was asked the same interview questions as detailed in the guide, interviews were conducted utilising a conversational approach. Prompts were used at times when the researcher believed more data could be obtained by rewording a question or to provide the participant with a little more information. Probing questions were also used in order to extract more detail about a comment or idea made by the participants. By adopting a conversational approach the researcher provides the interviewee with the opportunity to _give responses that allow access to knowledge about the meanings and interpretations that individuals give to their experiences' (Minichello et al., 2008, p. 1).

All seven interviews were conducted by the researcher and recorded by means of an audio recording device. Field notes were also taken by the researcher during the course of the interview to note any important non-verbal cues or other details that the researcher believed may be important in the analysis of data. The decision to record the interviews was made because not only does it provide a truer record rather than field notes alone but it also allows the interviewer to concentrate on engaging with the participant (Walsham, 2006, p. 323). The recording of non-verbal communication was undertaken in order to ensure that every attempt to comprehend the perspective of the interviewee had been considered. Interview data were then transcribed verbatim to allow for data analysis. This final step is discussed in more detail in the next section.

Data Analysis

A preferred analytical framework for the analysis of interview data, namely procedures used for inductive analysis of qualitative data described by Thomas (2006) was employed. The primary purpose of the inductive approach is to allow research findings to emerge from the frequent, dominant or significant themes inherent in the data, without the restraints imposed by more structured methodologies (Thomas, 2006, p. 238). Compared to more complex and specific procedural frameworks, such as those used for thematic analysis (Strauss & Corbin, 1998) or phenomenological analysis (Hycner, 1985), the framework outlined by Thomas (2006) provides a set of applied procedures, appropriate for this research, that describe a commonly used method of qualitative data analysis that has the ability to yield valid and reliable or trustworthy findings. Inductive analysis can be considered as an approach that primarily uses detailed readings of raw data to derive concepts, themes or a model through interpretations made from the raw data by the researcher (Thomas, 2006, p. 238).

The analysis of interview data followed a five step process suggested by Thomas (2006, p. 241) in his description of the procedure used for the inductive analysis of qualitative data:

1. Preparation of the raw data files
2. Close reading of the text
3. Creation of categories
4. Overlapping coded and uncoded text
5. Continuing revision and refinement of category system

Thomas (2006) explains the outcome of this procedure is an identification of a small number of the most important themes or categories most relevant to the research objectives. The following sub-sections describe in detail the processes that occurred during each of these five steps.

Preparation of the raw data files

The first step involved transcribing the raw data into a common format and making backup copies of each raw data file. As previously mentioned the audio recording of the interview was transcribed verbatim into a transcript file. The method for the creation of the transcript file was informed by Minichiello, Aroni and Hays (2008), who suggest that the file should be organised in a fashion that facilitates the process of coding for analysis. The file itself was structured in a way that placed the verbatim transcript of the interview in the centre of the page with wide margins on either side. The margins on the transcript file were used by the researcher to reflect on and analyse the content of the file. The left margin was included to record reflections of the researcher‘s interview practices (i.e. types of questions, probing, not interrupting etc) and to make any other notes about the interview regarding the setting or the manner of the interviewee. The right margin was included to provide space to record any general ideas, themes, coding categories or notes during the analysis of data. The text of the interview contained the researcher‘s and participants‘ initials to identify _who said what‘ as well as numbers throughout that

acted as time markers, although in this case the numbers were used to indicate the point in the tape recording at which the interviewer moved to the next question on the interview guide.

Close reading of the text

The next step in the data analysis involved the reading and re-reading of the text in detail to become familiar with its content and to begin to develop an understanding of the themes and events covered in the text. During this step, key points or themes were underlined for later analysis as suggested in the literature (Minichiello, Aroni, & Hays, 2008, p. 235). Notes relating to these points and themes were also made in the transcript file margins for use in the third step of the analytical procedure. An example of a transcript file demonstrating this stage of the analysis process is included in the appendices (Appendix F).

Creation of categories

Once each interview had been read and reread several times the creation of categories was conducted. In this step the data transcripts were reviewed in order to identify themes or concepts for coding of the data. At this point in the analysis, data were separated into four files to allow for the creation of categories specific to the foci of the investigation. As suggested by Thomas (2006, p. 241), the grouping of data was informed by the conceptual framework in order to provide a starting point for manual analysis. Data were separated into four files, one for each of the three constructs from Rogan and Grayson‘s model of implementation, namely; *Profile of Implementation* (IQ[11] 2); *Capacity to Innovate* (IQ2 & IQ3); and *Outside Support* (IQ 4). A fourth file, under the label *Advice for Other Schools* (IQ 5), was included to allow for any additional data that may not have arisen out of questioning based on the central constructs. Each of these files contained interview data from all participants. Specific categories for each of the constructs arose from the multiple readings of the raw data.

[11] IQ = Interview Question

It is important to note that whilst the constructs provided a focus for conducting the analysis, they did not provide a set of expectations about the outcome of the process. The use of literature informed research questions to guide the analysis is also consistent with the recommendations of Minichello et al. (2008, p. 267) who indicate that codes should be conceptually based and related to the questions asked.

In using the general inductive approach to code the data, specific categories were created from actual phrases or meanings in specific text segments. The decision on what may be coded was guided by Minichiello et al. (2008, p. 262) who suggested that the following be considered as units of analysis in in-depth interviewing; examples of each from the transcript are also provided.

- *Words*- examining the frequency that a word appears and the way in which it is used by the interviewee.
  "Oh, the facilities help a fair bit. A lot... I guess a lot of schools say public schools for example wouldn't have as good facilities. We've got the new gym and everything, and the timing gates".

- *Concepts*- looking for words that are grouped together in clusters that indicate particular ideas. Concepts are often used in the expression of themes.
  "I think it's to provide a scientific investigation of sports science, it provides the IB an avenue to teach the study of sports science in the diploma programme"

- *Sentences*- looking for sentences that explicitly say what the researcher is looking for.
  "The biggest challenges? There haven't been too many what I would call challenges. The main thing is to create enough interest in a pilot group to get

the subject up and running, because until you can actually get a subject up and running, and to get the initial cohort through".

- *Themes*- looking for themes expressed in the transcript. These may be expressed in single words, phrases, sentences, paragraphs or the document as a whole.

  "And another challenge is too that of course, and this is the important one while it is a pilot program. Because pilot courses can only be offered as SL subject. That is a major drawback for some students as well because... I would normally see sport science, when it"s, when it"s fully implemented around the world, I would see that as one science subject which will be taken by most of the students as an HL. Whereas the other science subjects the HL level is probably only done by a third of the candidates, because the HL courses are significantly more difficult than the SL. And I think ...when we finally get it, the HL version of Sports Science will be far more manageable, I think, by the average student.

Using these guidelines, data were coded and categories were created from themes that emerged from the data during the inductive process. During this step numerous specific categories were identified within each of the data files with the intention they would be grouped together or reduced in the next stages of the analysis. The development and use of the coding system was essential for organising and making sense of the data. Furthermore the use of the coding system allowed for the easy retrieval of data at a later time (Kvale, 1996; Minichello et al., 2008). It should also be noted, that other researchers acknowledge that the development of codes is an ongoing process and in this study that specific categories were refined and renamed during each of the steps. The next step in the analysis involved the further reduction in the number of specific categories identified.

Overlapping coded and uncoded text

The fourth step of the analysis involved the reduction of those specific categories which overlap or were redundant due to the fact they were not relevant to evaluation objectives. During this stage specific categories that had emerged out of the data from the different transcript files, were analysed as a whole and those which were overlapping were combined to reduce the total number of specific categories. This process was conducted in order to reduce overlap between specific categories and to identify those most important to the objectives of the study, whilst at the same time, removing those which were not relevant (Thomas, 2006, p. 242). It is also important to note that at this stage some sections of data were included in more than one specific category, due to relevance in the evaluation of other questions. Other segments of text were omitted completely. This was made possible due the researcher‘s familiarity with the data following the close reading of the raw data.

The result of this step of the analysis was the creation of several formal specific categories that resulted from the coding of the data. At this stage specific categories had three key features; a category label (a word or phrase used to refer to the category), a category description (a description of the meaning of the category), and text associated with the category (segments of verbatim text coded into the category which demonstrated meanings and perspectives associated to the category). This allowed for further reduction in the number of categories as similar or overlapping categories were grouped together under a common description.

Continuing revision and refinement of category system

The outcome of the inductive analysis process was the creation of a small number of specific categories that the researcher identified as capturing the key aspects of the themes identified in the raw data. This reduced the number of specific categories identified for each of the constructs. Quotes which conveyed the core theme or essence of the category were chosen from the raw data to be included in the reporting of results. At this stage the researcher is required to make decisions about which specific categories are the most important. The outcome of this

process, was the identification of the final list of specific categories and these will be discussed and reported on in the results section.

EVALUATION OF THE DESIGN

This section evaluates the design of this research through critique of trustworthiness, together with the assumptions and limitations of the study. The researcher‘s stance in this investigation will be acknowledged as a final section of this chapter.

Trustworthiness

To ensure the research yielded valid and reliable findings, basic strategies suggested in the literature were applied to achieve criteria for rigour or trustworthiness of qualitative research. The following strategies suggested in the literature (Creswell, 1998; Minichiello et al., 2008; Thomas, 2006) were to satisfy the trustworthiness criteria of credibility, transferability, dependability and confirmability (Lincoln & Guba, 1986).

Credibility

Credibility was ensured though both peer debriefing and member checking. During the course of the research, the researcher engaged in regular consultation with the supervisory team during all stages of analysis. This process allows the researcher to utilise the skills of a professional peer to assist in the development of valid and reliable conclusions (Lincoln & Guba, 1986). Following the coding of data by the researcher, one of the supervisors with extensive experience in manual analysis of qualitative data, also coded these same data. They came together to compare their resulting categories and there was high to very high levels of agreement on the categories. Independently, the principal researcher coded the interview data for category descriptions providing further strength to the analysis process.

Furthermore, the data that were coded as specific to the categories were also subject to inter-coder reliability checks by a different supervisor. As such there are

multiple levels of trustworthiness in the resultant categories and the data that led to their establishment.

Member checking was also used to enhance credibility of the research. This process involved the researcher providing participants with the verbatim transcript and identified categories for verification of accuracy. In order to verify the integrity of the data collected through in-depth interviews a process called member checking is commonly used (Minichello et al., 2008; Thomas, 2006). Participants were requested to comment on the interpretations made by the researcher and these comments were then used to correct any misinterpretations and finalise the analysis of the data.

Transferability

Transferability was achieved by ensuring that the methodological procedures used in both data collection and analysis were explained in a way that it is sufficiently descriptive. This has been done to ensure that other researchers are provided with the necessary detail to take the data and apply it elsewhere. A thick description of the case and the research problem being examined was also included for readers to determine how closely they can expand their interpretations of the findings to other similar situations.

Dependability and confirmability

To ensure dependability and confirmability, data has been kept so that an external audit of data may be carried out. This involved the keeping of an audit trail so that a research audit, where data are compared with the research findings and interpretations, may be conducted (Thomas, 2006, p. 243). Audit trail documentation included: audio files, transcripts, categories, and findings to allow for retrospective evaluation of the findings.

Assumptions and Limitations

The following assumptions/limitations need be acknowledged in considering the outcomes of the research.

1. The scope of the study is limited to one research site due to the uniqueness of the case to be examined, and accessibility to the researcher. The chosen research site is one of only fourteen schools worldwide piloting SEHS. It was also the only school in NSW, making it the only research site viably accessible to the researcher. The use of a single case is warranted in qualitative research if the case chosen is unusual or provides a unique opportunity for research (Eisenhardt & Graebner, 2007, p. 27).
2. It is important to acknowledge that the researcher has a keen interest in the value of examinable Physical Education in the curriculum. No researcher can be free from bias therefore it is important to acknowledge previous experience so the audience may make judgement for themselves regarding the potential effect that the researcher‘s perspective may have (Yin, 2011, p. 270)
3. The study is situated predominantly within the implementation phase of curriculum change, based on the assumption that there has already been an innovation phase that has lead to the piloting of SEHS. For this study the development of the curriculum innovation is assumed to follow a top-down model (Print, 1993) in that the change (SEHS pilot syllabus) has been passed onto the pilot schools from an educational authority (IBO). In making this assumption the dynamic nature of curriculum change is recognised and that these phases are not viewed as a linear process.
4. It is acknowledged that an argument could be made for the collapsing of some of the categories identified into a single larger category due to overlapping data. The decision not to collapse these categories was made following the initial analysis of data and the evidence that there was significant meaning attached to the creation of the separate categories.

Researcher Stance

It is important to acknowledge that the researcher has a keen interest in the value of examinable Physical Education in the curriculum and has spend eight years as a classroom teacher of the subject in both Australia and the United Kingdom. Whilst every attempt was made not to allow these biases to influence the study, this experience needs to be acknowledged.

SUMMARY

Case study research was selected for this study because it provided a methodological procedure suitable for investigating the research questions in all of their complexity and in the real-life context in which these phenomena occurred. Ethical issues were considered, addressed and approval gained prior to undertaking the project to ensure no harm to participants. Data collection involved an extensive review of literature, semi-structured interviews, as well as the keeping of field notes. Interviews occurred between October and November 2010.

Data analysis was conducted iteratively with data collection, and a general inductive approach to analysis was employed. The analysis of data led to the creation of specific categories, which were subject to two forms of inter-coder reliability checks and member checks, these practices strengthen the trustworthiness of the findings. These procedures were all designed to capture the experiences of the seven participants and to answer the four research questions surrounding the issues of curriculum implementation. The following chapters detail the results of the study and provide advice on potential issues that may be faced by other schools looking to implement the subject in the future.

CHAPTER FOUR

RESULTS

Results reported in this chapter are based on analysis of data from seven interview transcripts pertaining to Coordinator, Teacher and Student experiences in piloting the subject *Sports, Exercise and Health Science* (SEHS) in an Australian secondary school. The results of the analysis (Thomas 2006) answer the four research questions. The first three of which are aligned with the conceptual framework and are therefore also presented under the headings: *Profile of Implementation; the Capacity to Innovate; and, Outside support.* The last research question regarding the pilot school's overall experience is concerned with providing *Advice for Other Schools* intending to implement SEHS in their school. This question is designed to provide further understanding of issues relating to future implementation of SEHS.

In the process of the analysis of the data, a number of specific categories (Thomas, 2006) were identified. Key terms within the evidence have been highlighted to illustrate the link between evidence provided, specific category descriptions and the alignment with the answers to the four research questions.

This chapter has five sections. The first three sections in this chapter are focused on answering the three research questions relating to the alignment between the data and three constructs of the conceptual framework. The fourth section addresses the final research question relating to advice participants would provide to other schools regarding implementing in the future. The chapter concludes with a summary of the results.

PROFILE OF IMPLEMENTATION

Rogan and Grayson (2003) explain that the construct *Profile of Implementation* is –ni essence, an attempt to understand and express the extent to which the ideals of a set of curriculum proposals are being put into practice" (p. 1181). The first foci from the interview guide was therefore the examination of participants' understanding of SEHS as a subject in the IB Diploma Program. As described in the methodology chapter, the manual analysis processes resulted in emergent category descriptions. These are supported here with identification of text from interview transcripts (Thomas, 2006). Four specific categories were identified and labelled, namely: *Interdisciplinary Science; Alternative Science Subject; Pathway Subject;* and, *Demand for Inclusion.* Each specific category is now described.

Interdisciplinary Science

The category labelled *Interdisciplinary Science* describes SEHS as a subject that applies traditional elements of the pure sciences (Physics/Chemistry/Biology) to the sports and exercise context. The category description suggests that when compared to other Group 4[12] subjects in the IB Diploma Program, SEHS is considered a broader, more interdisciplinary study of science. Further, that a large component of SEHS involves laboratory work and experiments.

Data and data analysis underpinning the creation of this category label and description is presented in Table 4.1. The table identifies which participants contributed comments related to this category in answer to the interview question related to what they understood to be the aim of the subject. To provide clarification interview data presented is from one coordinator (Coordinator), two teachers (Teacher A/B), three current students (Student A/B/C) and one past student (Past Student). This evidence emerged from the inductive method of analysis suggested by Thomas (2006) and includes excerpts from the interview data from the IB Coordinator, teachers, current students and a past student.

[12] Group 4 is the Experimental Sciences group within the IB Diploma Programme. Current Group 4 subjects include Biology, Chemistry, Physics, and Design Technology.

Table 4.1. Evidence for category description – Interdisciplinary Science

Participants Evidence
Coordinator: *I think it"s a broader science subject.... I think it"s, because of its nature, its... it"s a broader group four subject because it does incorporate aspects of the other pure sciences. Biology/physics/chemistry certainly all those aspects are in there. ... And whereas it doesn"t go into the detailed chemistry or physics that the individual sciences do or the engineering that you"d find in design technology as well. But it does draw together certain aspects of them all. It sort of synthesises them all and I think that"s a huge plus in a subject like sports science.* *I think from my point of view it"s the same aim as it is for all group four subjects, and that is to enable the students to do any sort of research in any of the scientific fields and to use that knowledge, to use that research to solve relevant problems within that field. That"s... that"s what all the sciences are about. I think that anyway and that"s a broad, a very broad aim I know, but as far as specific aims are concerned I suppose that... that the sports science one is to allow students to have a detailed knowledge of all aspects of sports science.* *....and sports science too, because they get the chance to do all these practical experiments, write up results, doing all sort of measurement and evaluation.*
Teacher A: *Well from my point of view the aim of this subject is to enable the students to be able to have the opportunity to be able to study human science or sports science, exercise science* ***Teacher B:*** *I think it"s to provide... to provide a scientific investigation of sports science. So it brings sports sciences in line with the other group 4 subjects.* *I guess well it... it formalises the study of sport science. It takes into account a lot of those areas. It"s been categorised as a group four subject because it"s a scientific investigation of the factors that impact on sports performance.* *I guess it just means the subject area has been recognised by the IB, but in so doing being a group four subject it has to follow the same internal assessment procedures, so it means that it has to be a scientific study. So... which means the students have to design scientific investigations in the study of sport.* *it gives them a broad study of science with, you know, they study aspects of biology and chemistry and physics without going into one of them in particular. It gives them a much broader study of science* *it can provide an opportunity in the science field where a student can study a broader science rather than a science that is strictly chemistry or physics or*

biology for two years. It gives elements of all those courses and it links back to.. to sport
Student A: *To be an interdisciplinary course, so you know, you can look at sports sciences from a lot of different points of view. You can get, you know, biology, physiology, even chemistry- when it comes to digestion, you know, nutrition.* *...what the subject is, you know, sports science, there is no one science that applies to it over another, so in that sense it"s interdisciplinary, cause you know, in order to understand the biology of the human body you have to go into the chemistry of, you know, why you"re digesting things in the stomach, and in that way things sort of weave together.* *So this course... involves a ton of lab work, and then there"s a lot of you know, lab reports which we do on our own time, so we have to be able to, you know create a lab, you know, create a proper procedure, do the research and be able to make our own conclusions and we do pretty much all of that without the input of a teacher, you know barring the background information before we do it and you know, what we can improve on after we hand in the lab.* ***Student C:*** *To educate us about sports exercise and health science I guess. To broaden our knowledge of those sort of areas of knowledge I guess.*
Past Student: ... *I think it was just putting a scientific approach to physical education.* *...but for sports science it"s more in terms of you know, putting a scientific method to conducting research and looking at how, you know, human beings move and interact and how the cardiovascular system works and all that, so yeah so it"s just putting a really legitimate scientific approach to the whole physical education kind of thing.*

Data found in Table 4.1 indicates that participants consider SEHS to be an interdisciplinary science subject incorporating elements of the traditional sciences of Chemistry, Biology and Physics. More specifically, comments by the coordinator and teachers suggest the subject is a broader science amongst the IB Group 4 subjects and draws upon other disciplines to allow for a scientific investigation in the study of sport. Coordinator and teacher comments mentioned the practical nature of the subject, in particular, the scientific investigations and laboratory experiments involved in the study of SEHS. Comments provided by the current students reflected this view and augments the suggestion that SEHS was viewed as an interdisciplinary science subject. The past student confirmed these perspectives,

that SEHS provided a legitimate scientific approach to the physical education subject area.

Alternative Science Subject

The category labelled Broader *Alternative Science Subject* describes SEHS as a further offering within Group 4 subjects of the IB Diploma Programme. According to the category description, SEHS as an alternative subject satisfies the need for an IB subject to relate to the study of sport science, which is comparable to subjects currently available in national and state curriculum. Based on these interview data presented in Table 4.2 evidence of SEHS providing an alternative subject is based on the data being synthesised and representing: opportunities for students by offering a range of subject choices, filling a perceived gap in the curriculum, and the provision of a holistic education.

Table 4.2. Evidence for category description – Alternative Science Subject

Participants Evidence
Coordinator: *...It's a group four subject which isn't... doesn't place the same demands on students from the point of view of having a...a knowledge of the... the pure chemistry or the pure physics and even to a certain extent you know, some of the aspects of biology which can be for some students, who, and we've had many doing the IB, haven't been able to really choose a science subject, because they haven't particularly liked or been good enough at straight physics or straight chemistry and they've... and that's been one of the reasons they've actually shied off the..the IB program.* *That's why we've introduced, one of the reasons why we've introduced sports science to try to attract some of those students who perhaps normally wouldn't have chosen the IB for the reasons I've already mentioned.* *Absolutely, I think that it is an area that has been missing for a long time*
Teacher A: *Sure. Well I think anywhere in education you need to be able to have a variety of educational opportunities for the students. There's language, there's English, there's Mathematics, there's you know, Biology side of things in the IB, all the different areas except sports science so I think it would only be fair and justifiable to have a sports science component in that for students who are interested in pursuing that. So it's just about opportunities* *Well from my limited time and exposure to the IB it seems that the IB is all about holistic education isn't it. I mean you've got, you've got the... the*

language side, you've got the academic side you got the service community service side, so I think it really plugs that other dimension of it all.

Teacher B:*....it provides the IB an avenue to teach the study of sports science in the diploma programme*

And as I said too. It's good for, from the group four perspective, it fills that need for students who aren't necessarily, you know interested in studying sciences at university. So whilst it can help filter them into undergraduate sports science related courses, because it's broader than the other sciences it can be quite interesting cause it looks at a number of the different sciences.

That's correct; I mean they have to take a science, so it gives them an opportunity... I mean that and design and technology are sort of science... alternative sciences almost. You know, there's an alternative choice to your mainstream biology/chem/physics.

Student A: *Let's see, it would... I don't know, it sort of fills a gap where it, you know there are a lot of courses in IB that are, you know, job specific..... so anyone interested in, you know, sports related, you know, even if someone's going to be a professional athlete they have to, you know, it would be good for them to know, their sports and be familiar with it cause it can help them reach the next level. You know on the other hand you want to be you know, do sports science, research or something like you're doing*

Student C: *I think there is cause it is just good to be able to have a broader range of subjects, it's one of the things that the IB is good at, it has a lot of subjects that the HSC for example doesn't cater for. And if students demand the subject to be there I guess it's pretty important to be able to cater for that.*

Past Student*: Well I guess it's just a new topic, like you know if you're not interested in biology or chemistry or physics, you know, physical, I mean sports science is definitely like a new approach and you know, it's like a new topic that you might be interested in and I guess that's... that's pretty much it.*

So I guess there's really no need for it but in terms of, you know, people who want an alternative to the traditional schools of science like chemistry and physics and biology I mean yeah it's definitely a good alternative for kids who you know want to get involved outdoors and at the same time, you know, do learn scientific methods and apply it to experiments and what not.

Data presented in Table 4.2 provides evidence that SEHS is viewed by participants as a subject that provides an alternative subject choice to the more traditional science disciplines within Group 4. Comments made by the coordinator suggest that offering SEHS may help to attract students who otherwise may not have chosen to study the Diploma Programme. The need for a variety of subject choices in the

curriculum to cater for the differing interests of students and provide a variety of educational opportunities was a strong theme coming through in responses made by teachers. The view was also expressed by the coordinator that SEHS had been missing from the Diploma Programme particularly considering other curriculums were offering a comparable subject to students. Comments made by current students mirrored the view that SEHS –ilfs a gap" and that it helped to provide a broader range of subject offerings. Comments from the past student provided strength to the claim that SEHS provides an alternative to the traditional sciences.

Pathway Subject

The category labelled *Pathway Subject* describes SEHS as a school subject which provides pathways into either further education (e.g. Science degrees, Medical degrees, postgraduate degrees in physiotherapy or Sports Science, Bachelor of Education (Human Movement), Medicine or Physiotherapy) and/or career opportunities in the sports and exercise industry (e.g. Physiotherapy, fitness training, personal training, sports coaching, sports scientist). Table 4.3 provides evidence of this category from the transcripts of the coordinator; teachers; and, current students.

Table 4.3. Evidence for category description - Pathway Subject

Participants evidence
Coordinator: *I think it certainly does give you a lead into that industry. Both into the medical side of it, which is becoming more and more important with, you know, fitness and physiology and... and all that sort of side of it. And of course sports psychology is huge... I mean that's an excellent option too I think, I think in the IB Diploma Programme. I think sports psychology is one we do here for that reason.* *....as I said, a lot of them want to become physiotherapists or becoming interested in the fitness training, personal training area. It's a perfect lead in for them.*
Teacher A: *...looking at getting good ATAR's to be able to go towards doing the medicines and the higher science degrees that are available at the universities. So it gives them a better preparation for that. So in summary it gives kids opportunities to study sports science in a more in-depth way, and to open up career doors.*

Teacher B: *... it provides for students who have an interest in sport, you know, who have a passion for the area. Perhaps they're elite sportsman themselves, perhaps they're simply interested in sport, perhaps coaching at the higher level. They might be interested in pursuing post-graduate studies in the area of physiotherapy or sports science, so it provides a good introduction for those students.* *Well it"s good for physiotherapy, sports science, you know bachelor of education/ human movements any... any of those courses.*
Student A: *Also, you know, if anybody"s interested in sports medicine, you know, as maybe a future career it"s obviously a course to take cause it"s, you know, straight into it.* *....I think, yeah, there is a more, you know, post high school professional focus in your course choice so anyone interested in, you know, sports related, you know, even if someone"s going to be a professional athlete they have to, you know, it would be good for them to know, their sports and be familiar with it cause it can help them reach the next level. You know on the other hand you want to be you know, do sports science, research or something like you"re doing, or you know.* ***Student B:*** *I don"t know, I mean they probably could use it if they want to be (sic) physiotherapy, things like that.* *...so I think there is a need for it for people who want to get further in their studies.* *To produce knowledgeable and possibly people interested in that as a further career maybe... sports scientist specifically, um, physio I guess, branches of medicine.*
Past Student: *No evidence*

Data found in Table 4.3 provides strong evidence that SEHS is viewed as a subject that may provide a pathway into a future career or entry into tertiary education. More specifically, comments by the coordinator and teachers suggest the subject leads to courses at university level in a range of areas including; medicine and medical sciences, physiotherapy, and sports science. Whilst comments by current students closely reflected those of the school staff, these students also introduced perspectives that the subject could be useful for individuals looking to become professional athletes or to continue with sports science research. The past student did not provide any responses that support the creation this category.

Demand for Inclusion

The category labelled *Demand for Inclusion* describes the existence of a demand for a sport-related science subject in the Group 4 offerings of the international Diploma Programme. Based on the data presented in Table 4.4, the evidence suggests that the subject is expected to be a popular inclusion within the IB curriculum.

Table 4.4. Evidence for category description – Demand for Inclusion

Participants evidence
Coordinator: *Absolutely, I think that it an area that has been missing for a long time.* *I think so; I think that's what's been the driving force. And the worldwide increase in the... in the interest, in the interest of knowledge in sport sciences and... and... and sports psychology and physiology and in fitness and that sort of thing as people strive... well on a professional level to...* *But as the IB program has spread worldwide and now it's, you know, scattered right through... all of Europe... through North and South America, now through all of Australiasisa.... the schools in those sorts of countries are now demanding a subject which often has existed in some form in their own local curriculum but...hasn't ever been part of an international curriculum before. And...and I think there is a great need for it because.... because let's face it, sports and exercise science is, well it is a huge industry throughout the world, a huge industry. Both the... the actual scientific side of it, but also the, you know, obviously sport is big business.*
Teacher B: *Well just that there's an interest... there is student interest in it. And it gives them an opportunity to study, you know, sport in depth and... yeah, because of that interest level it's proving popular.* *Well I just think, you know, if you're looking from an international perspective, I mean, there is, you know... you know there's a... I guess... what would you say... a high school matriculation course obviously in the UK, where the IB is very big in terms of A-level study of sport there. You know, in Australia again its... you know, the study of PDHPE in New South Wales, and then you've got VCE in Victoria which looks at sports science... Queensland have a similar qualification. You know, I'm not so sure about America whether they... have it you know at high school level, but I'm sure they do have some sort of foundation courses in that area. So look I think the study of sport universally is important, a lot of students are interested in it... and so attracting students to the subject hasn't been a problem, sort of here or internationally. Actually it seems to have been pretty well received. So there's obviously a need for it.*

Student A: *yeah I mean a lot of kids who did this course had a big sporting background so I think that's what kinda enticed a lot more people to do it.*

Student B: *range of subjects, it's one of the things that the IB is good at, it has a lot of subjects that the HSC for example doesn't cater for. And if students demand the subject to be there I guess it's pretty important to be able to cater for that.*

Yeah I think there'll be a need for it, well for example the newer year that's coming in now, the year eleven's who've just started, I know they've got a larger class than we do, I'm pretty sure. So obviously the general feel for sports exercise and health science is that it's more popular, more people want to be doing it and.. yeah more people want to do it you need to cater for it.

Past Student: *Need? Maybe not. But want, definitely. I mean, I mean there's, I guess in the traditional sense you know sports science is not one of the main schools of science that you do now days in school.*

Table 4.4 presents data predominantly provided in response to the question regarding the perceived need for the inclusion of SEHS in the Diploma Programme. There is strong evidence to suggest that participants believed there is a demand for the inclusion of SEHS in the Diploma Programme. Comments made by both the coordinator and one teacher suggest this demand comes from; student interest in the subject, and the increase in interest in the area of sports science within the educational community. Comments from both the past and current students provided further strength for the identification of this category suggesting that existence of student interest and popularity of the subject and provided evidence of a perception that a demand exists. Comments also provide evidence that the subject has been well received at the research site.

In summary, this first section has answered the research question: **From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Profile of Implementation?** Results reported in this section provide evidence for the identification of four specific categories aligned with the *Profile of Implementation.* These specific categories are labelled, *Interdisciplinary Science, Alternative Science Subject, Pathway Subject* and *Demand for Inclusion.* These

categories describe participant understandings of SEHS which have arisen out of their experiences in the piloting the subject at the research site providing an insight into the extent to which the processes of the curriculum change have been put into practice. Responses from all participant groups illustrated that there was a view that SEHS is considered to be an interdisciplinary science subject that provides an alternative choice to other Group 4 subjects. SEHS is also viewed as a subject that provides pathways into further study (in areas such as medicine, physiotherapy, sports science) or future careers in sports science related industries. Finally, there is a perception amongst all participants that a demand exists for the inclusion of a subject like SEHS within the Diploma Programme.

CAPACITY TO INNOVATE

Rogan and Grayson (2003) explain the construct *Capacity to Innovate* as —a attempt to understand and elaborate on the factors that are able to support, or hinder, the implementation of new ideas and practices in a system such as a school" (p. 1186). The second foci of the interview guide is therefore participants' experiences of the factors that had affected implementation of SEHS at the research site. Six specific categories were identified and labelled, namely *Resources; Access to Facilities; School Support; Student Interest*; *Standard Level;* and, *Teachers.* Evidence of these specific categories are now presented.

Resources

The category labelled *Resources* describes that the absence of subject specific resources, in particular a prescribed text written for the subject, was identified as a challenge by both staff and students during the piloting of SEHS.

Table 4.5. Evidence for category description - Resources

Participants evidence
Coordinator: *No evidence*
Teacher B: *I mean initially the main challenge was the fact that resources have been limited. You know, there's no text book to go from. I mean, you know it tends to be a philosophy anyway, the IB, that strictly speaking you shouldn't be teaching from one text book, but I guess initially it is quite daunting when you haven't got anything to go from. You've just got a syllabus in front of you, and... you know, you're just a little bit unsure of... of where to go with it.* *Yeah, well just sort of knowing what text books were going to best which, you know, I guess because the fact the PDHPE course here is essentially more of a humanities based course, the textbook there isn't particularly helpful.*
Student A: *I don't think that sports science is really getting the funding that it needs, you know, because there are, there's a lot of specific equipment that we can use in own labs to take it to the next level, you know, of reliability in our data, but, you know, it is expensive equipment and so, you know, the school doesn't really want to spend so much money on a, you know, fledgling program.* ***Student C:*** *Oh, well the fact that it's a pilot course means that we don't have too much experience in it. Teachers are doing a pretty good job given that and sort of going into new territory a bit, but things like going mostly off the slide shows and things like that, sort of hinders it a bit.*
Past Student: *Oh I think that the biggest problem we had was not having a textbook to refer to. I mean a lot of the content we learn was, you know, through powerpoint presentation slides and a lot of the times when you're revising or looking up a specific term, there's often sometimes that you don't have a textbook to refer to and you have to you know go to the internet or flick through presentations again to look up meanings and all that, and I found that really troublesome sometimes because, you know, if you want to revisit or relearn a topic that you did, there's no textbook to go to and its often really time consuming for you have to go to you know, google or just look up other people's notes just to find out what you know, a simple term means.* *Well definitely, just, you know, a secondary source of I mean what you, you don't learn in classrooms you often refer to a textbook but in this case means that's always a big problem there was none.*

Data presented in Table 4.5 provides evidence from one teacher, that the absence of prescribed textbook and a lack of existing subject specific resource materials, posed a challenge in both the learning of the subject and the delivery at the research site. Teacher B's comments highlighted the challenges in delivering the

content with only a syllabus document and limited resources such as the internet. Evidence provided by past and current student participants placed more emphasis on the impact that a lack of textbook had on their ability to learn the content. A reference to the existence of teacher constructed resources (PowerPoint slides) was also made by a current student.

Access to Facilities

The category labelled *Access to Facilities* describes facilities of a high standard as an assisting factor in the delivery and learning of SEHS subject content. Based on the data found in Table 4.6, facilities referred to in this case relate to sports and science facilities present at the research site (fitness centre, fitness laboratory, gym equipment, science laboratories, and an indoor running track). These were mentioned by all interview groups.

Table 4.6. Evidence for category description – Access to Facilities

Participants evidence
Coordinator: *.... and of course our facilities are second to none anyway so...* *well I think we've got the... the fitness centre, fitness laboratory, the... gym centre, I mean, that's an outstanding facility, which is really the envy of so many, so many schools of so many institutions full stop, you know. That... that certainly makes it a lot easier to do all you have to do. Plus we have for certain experiments too they use, they use science laboratories, of course which we're well served.*
Teacher B: *I mean the facilities we've got here. I mean have made it, you know... last year, you know, we had access to things like timing gates which made, you know, some of the labs good. I mean now this year with the indoor running track and the way we can set up our labs in there, that's been, you know...* *... having the facilities definitely, yeah.* *You know... I mean if you had some sort of.... you know, designated gym or an area where you can conduct labs in a controlled... controlled manner is...is probably, I mean not essential, I mean because the IB is trying to cater for all schools but I mean, you do need some... I mean to conduct scientific investigations, if you've got an indoor gym it... it's certainly helpful.*
Student B:*... And also I think with like our school, they get the good like, the needed equipment, So if we, if need like a sphagmometer or some- I don't*

know how to say it ***Student C:*** *Oh, the facilities help a fair bit. A lot... I guess a lot of school‟s say public schools for example wouldn‟t have as good facilities. We‟ve got the new gym and everything, and the timing gates and yeah.* *Oh, things like the science equipment available to us, we‟ve got a pretty big science department so just data loggers and that sort of stuff and when we‟ve been conducting research*
Past Student: *Facilities, I mean we have you know, a (sic) very, very, very good facilities for everything you ever need for PE. And in terms of you know, when we learn about blood pressure the first thing we do is, you know, we never have problem getting you know heart pressure sets or when we‟re doing heart rate experiments, there‟s never a time when we didn‟t have enough you know, heart rate reading equipments. So facilities, the gym you know, everything we needed was always on hand so that really, really helped.*

Data presented in Table 4.6 is a strong indication that the majority of participants are acutely aware that the research site has excellent facilities available for use in teaching and learning and that these facilities have assisted in the implementation of SEHS. The coordinator and Teacher B‘s comments detail how having access to these facilities has allowed them to conduct physiological laboratory experiments in a controlled environment. This was supported by evidence provided in student comments which suggested that always having good facilities and appropriate equipment had helped in their learning.

School Support

The category labelled *School Support* describes the broad support from the school, in particular the school board and executive, as being important in the implementation of SEHS. Specifically financial support was provided in terms of allowing the subject to run with a small cohort during the pilot process, the purchasing of resources, and allowing a teacher to attend steering committee meetings at IBO headquarters were all identified as school supports by the coordinator and the teachers. Students did not comment on this aspect. This is evidenced in Table 4.7 under School Support.

Table 4.7. Evidence for category description – School Support

Participants evidence
Coordinator: *This year we didn't have... we only had a very small cohort and there just wasn't enough science subjects, or there were too many science subjects to go around. So...the first victim of course was Sports Science, cause we only had about one... one or two so I suppose for economic reasons, and I suppose that's... that's a challenge, is to... is to convince the school council, the.. headmaster, that... that it... even if we've only got a very small number, that economically it might not be viable but the spin off, the benefits for the school in the long term are enormous. And I think, that's important because basically we've had the support of the school, the support of the council and the head, and we've been allowed to run sports science with very few numbers, simply to... well we try to provide as big an offering as we can of subjects and thereby attract more students to the IB program. So it's a... and we know that if you restrict the IB offering of subjects then you... you will cut out a large number of students. And that's what a lot of schools have found. That on the one hand they've had to restrict they're offering for economic reasons, which is fair enough. But it does have the effect that then you don't attract all the students you probably would attract if you could offer a bigger range of subjects.* *Oh absolutely because we've been allowed to run these small courses, in so many subjects. And if we weren't able to run them we wouldn't, we wouldn't attract the students.* *Well I think just the willingness of the school to... to... to support a small class like that. Financially, to give it full allocation of lesson time, that's... that's certainly assisted. And the school has promoted it, the school has also allowed Teacher B of course to become involved in the pilot sort of steering committee from... from day one. Which was huge, because that was a financial outlay. Not the actual cost of transport and accommodation in Cardiff where Teacher B goes off to. But while he's away, it's during school time and of course his classes have to then be covered by someone else and that's an extra expense.*
Teacher B: *... Not really, I mean the school's been very supportive in terms of buying resources and... you know... running classes that... I mean we're not, you know... we've had six in the two groups through so the support of the school in terms of, you know, operating with, you know, a fairly small cohort has been good. Some other schools might not be able to... to do that with such a small group. So that's been... yeah that's been good.* *With resources and as I said running the classes and... yeah, I mean all the information I've got from our IB coordinator „s been and I guess the you know, working with the science department. They've all been very helpful in terms of, you know, making me feel part of the science department cause it's sort of I guess once you undertake this you're no longer really in a way, part of the*

PDHPE faculty. It"s really part of the science faculty so it"s... So that"s been helpful as well. *Yeah, and I guess the other support I got from the school in terms of you know, giving me... this year I had to take a week of leave to attend an IB meeting, which was you know, appreciated.*
Current Students: *No evidence*
Past Student: *No evidence*

Data presented in table 4.7 was provided only by those two staff members with experience in the administration side of the subject. Comments indicate that the school had been supportive by providing multiple resources in the implementation of SEHS. In particular coordinator comments referred to the financial support provided in running a subject with small numbers in a class with the view that it would benefit the school in the longer term. Teacher B made reference to support provided by the school in allowing the teacher initially involved in the piloting to attend pilot steering committee meetings abroad, which again required financial support. Teacher comments also acknowledged support received from the school regarding running the subject with a small cohort and the purchasing of resources.

Student Interest

The category labelled *Student Interest* describes the challenge faced in developing student interest in a new subject during implementation. Based on the data in Table 4.8, schools need to be make students aware of the nature of the subject and its content in order to attract enrolments and get enough students interested in the subject in order to make it viable.

Table 4.8. Evidence for category description – Student Interest

Participants evidence
Coordinator: *The biggest challenges? There haven"t been too many what I would call challenges. The... the main thing is to create enough interest in a pilot group to get the subject up and running, because until you can actually get a subject up and running, and to get the initial cohort through... and you get some reasonable results, and then you know word of mouth, actually then... that will attract more and more students. So if... if there has been a challenge it"s mainly to get you know that first... that initial group through and*

get them talking about their experiences and how valuable the whole program has been to them. And get them talking to other students so we can maintain a program each year in Sports... in Sports Science. We... we haven't been totally successful in that regard. One year, and again, I suppose very much to on the size of the candidature... size of the cohort. This year we didn't have... we only had a very small cohort and there just wasn't enough science subjects, or there were too many science subjects to go around. So...the first victim of course was sports science, cause we only had about one... one or two so I suppose for economic reasons, and I suppose that's... that's a challenge, is to... is to convince the school council, the.. headmaster, that... that it... even if we've only got a very small number, that economically it might not be viable but the spin off, the benefits for the school in the long term are enormous. *Well it... the IB information nights and...and year 10 subject selection nights. I had the opportunity... I mean I talk about all the IB subjects, I made a big point of saying that we'd been specially selected in the world, you know, to pilot SEHS. And I outlined what... briefly what it was about, who... who it was trying to target and why it would be ideal for certain students. At that stage of course we... we barely had... we only had a course outline, there wasn't even a subject guide. So you know it was difficult to... to be able to handle anything terribly specific. And then we have a course guide booklet which we did produce and... and that's where the brief outline of the course was, but it really was just getting up there to inspire some... some of the kids to... to think about doing it and... and at that stage Teacher B... well he was sort of the designated teacher and he knew a little bit about it and he was trying to promote it as well within, I think within classes in year ten. Just letting them know this course, this new course was on offer.* *Oh absolutely because we've been allowed to run these small courses, in so many subjects. And if we weren't able to run them we wouldn't, we wouldn't attract the students. There's no way in the world we would attract the students. And so you've got to ... you've got to give them a taste of the course for them to make up their own minds... And then we let word of mouth and results, and parental, you know, parental opinion...*
Teacher A: *Well there would be some but... and part of that would be numbers of boys wanting to do it. You need to have numbers to do it. Yeah, and there's been these numbers coming through so unless you've got the number you can't run the subject.*
Current Students: *No evidence*
Past Student: *No evidence*

Data presented in Table 4.8 provides evidence to suggest that one of the key challenges faced at the research site was getting the student interest to allow the subject to run. This was a particularly strong theme in comments made by the

coordinator who was heavily involved in getting SEHS up and running at the school. The coordinator also explained that once the initial interest was generated it was easier to attract students to the subject. It can be extraneous factors that impinge on the student interest – outside SEHS itself. For example it can be the number of subjects offered which competed on the same subject line and the lack of detailed data on the subject were identified as a challenge to gaining student interest. The comment from the teacher suggests that staff were also aware that getting enough students interested in the subject was a key to the long-term adoption of SEHS in the curriculum.

Standard Level

The category labelled *Standard Level* describes having SEHS limited to a Standard Level qualification during the piloting process as a challenge in terms of attracting students to take the course. Students who had the desire to take the subject at higher level were not able to and this was seen as a disadvantage. In particular, this was a clear theme particular in comments made by both past and present students.

Table 4.9. Evidence for category description – Standard Level

Participants evidence
Co-ordinator: *And another challenge is too that of course, and this is the important one while it is a pilot program. Because pilot courses can only be offered as SL subject. That is a major drawback for... for some students as well because, you know, if you"re... I would normally see sport science, when it"s, when it"s fully implemented around the world, I would see that as one science subject which will be taken by most of the students as an HL. Whereas the other science subjects the HL level is probably only done by a third of the candidates, because the HL courses are significantly more difficult than the SL. And I think though ... I think when the... the...when it... when we finally get it, the HL version of... of Sports Science will be far more manageable, I think, by the average student.* *I think, some.. some students, because of the natu... the IB set up, because three of their subjects have to be at HL, If they"re not great mathematicians of course they"re not going to do HL maths. So that"s one out. If they"re not excellent English students, given the amount of reading, they"re not going to do HL English. A lot of them find, in this part of the world, find their language,*

they're second language learning at HL level beyond them and so that do that SL, so basically we're running out of options, and if they struggle with their, with their pure sciences at HL, and some do, then they really don't have enough HL subjects and therefore they're forced to pick a subject at HL that they're not terribly confident with, and often that is a science. Whereas I think... I get the feeling, talking to the students who do, were doing sports science that they are... they would be more than capable of doing Sports Science at Higher Level. Just given the nature of the course, cause it so much broader and because it is more hands on. I mean I could be proven wrong but that's just a... that's just my feeling at the stage from...from what I've seen

Teachers: *No evidence*

Student A: *Well really before its accredited as you probably know about IB, you have to have at least 3 HL subjects, higher level, and you know, sports science is actually one of my stronger classes so, you know, I would have really loved to take this as one of my HL classes but I can't because it's still in its pilot phase, so I actually ended up to choose one of my weaker subjects, which is film as my third HL... And I think that deters kids from taking it.*

Yeah, definitely, because I've actually talked to other kids about it you know, incoming IB students, and a bunch that were interested in it and they asked me about the program, but in the end they decided not to do it because, they needed, you know, that slot for their HL subject and they couldn't take Sport Science as one.

Yeah, and I think that really, you know, limits the amount of students that apply to take this course.

Past student:*..And also I think one of the biggest problems was since it was a piloting course we learnt all the content even though it was only a Standard Level subject... To me I thought that was a little... I mean it was a little unfair in the way that even though we are doing effectively higher level standard, by learning every single bit of content, it was only counted as a standard level subject. that was one of the biggest problems I had.*

Yeah, in general it was just a challenge. I mean I thought that by doing so much more work I think we should get credit for what we actually learnt but you know, at the end it only counted for standard level subject. So that and not having a textbook would be my biggest problems

Definitely, definitely, I mean it definitely turns off a lot more kids in terms of picking it was a subject because here they are confronted with the problem that, oh you know, you have to learn a stack load of content but it's not going to count what should be in the end.

Yeah, well kids, when you have opening, you know, information nights and what not and you get, kids get explained to them that you'll be learning ten out of ten topics and in... in IB sense that should count as a higher level subject

but it won't you're only going to get a standard level credential for it and, you know, a lot of kids are going to be like, well do I really want to put in that much effort and not get you know, a high level credit. That's the problem.

Data presented in Table 4.9 provides evidence to suggest that the inability to offer SEHS as a Higher Level subject has been a challenge during the implementation of the subject at the research site. Coordinator comments suggest that due to the nature of SEHS as a subject offering, many students would opt to take it through as one of their 3 HL subjects if given the choice. Student comments highlighted issues related to workload involved in the subject considering the subject would only count as a SL qualification at the end. Students indicated knowledge that having the subject limited to SL had prevented some other students from choosing to study SEHS at their school.

Teachers

The category labelled *Teachers* describes the role of teaching staff as important in implementation. Based on the data in Table 4.10, teaching staff have been important in meeting challenges during implementation and students have valued the role of their teachers. Comments from the current and past students highlighted this category.

Table 4.10. Evidence for category description – Teachers

Participants evidence
Coordinator: *No evidence*
Teachers: *No evidence*
Student A: *Well, I mean, obviously we have, you know, great resource in our teachers, like Teacher B he, you know, he has, you know, worked with sports science and you know, PDHPE before and so, you know we didn't really have to bring any new teachers in for that* *Well a lot of them are in, you know, are coaches for sports as well so you know, you come back to the applicat- applicable, you know, point where, you know, how does this really relate to sport and, you know, all the time, you know, Teacher B you know, cause he coaches rugby, he can apply, you know, concepts that we're learning to how they apply on the rugby field and give us that, you know, real world sort of analysis.*

Student B: *Oh... I wouldn"t say there"s been too many challenges, I mean, cause we have- we have one of the head IB people, like teachers, so he"s been through it all before ... No I don- I don"t think there is any challenges.*

Definitely, like the teachers that we have...

...because we, he"s, I think he, he kno-, like he knows his stuff. And we have like a wide range of teachers that, like, we have like, when Sir went away on holiday we had like back up teachers that were still very good.

Oh there"s the support, good support from all the teachers and things like that

Well they"re just, they"re just - instead of a teacher, a teacher not reminding a student, whereas all our teachers always remind us you gotta get the work in, come on...

Like th- they don"t just remind us you don"t do the work, we"re not going to help. You they still try to push you along.

Student C: *Well the fact that the teachers are getting pretty involved in it, like the trip, like frequent trips to overseas to the IBO, the head of sports science over there and... helping to write the test, getting more knowledge about it, trying their best to break that sort of pilot thing and get more into it.*

Past Student: *Oh well, obviously we a have syllabus to follow when you"re doing a course and all of that content is really just a big credit to my teacher {SM-B} just his own research, for example, in the syllabus there is ten terms you have to learn, those ten terms will be put onto a PowerPoint presentation with their meanings*

The teachers were very open. I mean not just our, not just the sports science teacher but the head of the IB, you know, he wanted constant feedback on you know, how could the subject be improved so you know there was a lot of communication between the people who were implementing it and the people who were studying the subject. So there wasn"t a big hierarchy that you had to go through to you know express some concerns or whatever, you know. People were always open to opinions and wanted to know how the whole thing could be improved.

The teachers were great you know, they did everything they could to help you whenever they could, yeah. Big credit and kudos to them.

Data presented in Table 4.10 demonstrates the high regard in which teaching staff are held by students at the research site. Student comments suggest that having teachers who are open and knowledgeable was a factor that assisted in the

implementation. Comments provide clear evidence that the students viewed the teaching staff as playing a central role in the success of implementation of SEHS at the research site. Coordinator and teaching staff did not provide responses relating to the role of teachers during implementation during this section of the interview.

In summary, the data analysis provided categories that coalesce to answer the second research question: **From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Capacity to Innovate?** Results reported in this section provide evidence for the identification of the six categories: *Resources; Access to Facilities; School Support; Student Interest*; *Standard Level;* and, *Teachers.* These six specific categories emerge out of the data for *Capacity to Innovate* and describe factors that were perceived as supporting or hindering the implementation of SEHS at the research site. Participant responses suggested that the willingness of the school to provide support (particularly financial), the facilities available, and the quality of teachers were all factors that had assisted with the implementation of SHES at the research site. The challenges experienced by the participants included: a lack of subject specific resources (particularly a textbook); developing enough initial interest in the subject to get it up and running; and, the fact that the subject was limited to a Standard Level offering.

OUTSIDE SUPPORT

The third of Rogan and Grayson's (2003) constructs, *Outside Support,* is described as related to support that is received by —organisations outside the school, including departments of education, that interact with a school in order to facilitate innovation" (p. 1191). Therefore the third of the foci from the interview guide was the examination of what, if any, outside support was provided to the school during implementation of SEHS. Four specific categories were identified and labelled, namely: *Student Awareness; IBO Support; Limited Outside Support; and, Professional Communication.* The data supporting these results are now provided.

Student Awareness

The category *Student Awareness* describes student participants being unaware of any outside assistance received by the school during the piloting process. This was a common theme in responses to this question from students both past and present.

Table 4.11. Evidence for category description – Student Awareness

Participants evidence
Coordinator: *No evidence*
Teachers: *No evidence*
Student A: *No, not really aware of any, that point.* ***Student B:*** *I don't, I don- like I don't know the behind the scenes... kind of thing, so I dunno, it's pretty much student teacher... like he does all the behind...* ***Student C:*** *None that I'm aware of*
Past Student: *Ah, I wouldn't know much about that but you know I'm sure they did, but in terms of me as a student seeing it... no I didn't see anything.*

Data presented in table 4.11 was provided by participants in response to the interview guide question relating to participants knowledge of any outside support received by the school during the implementation of SEHS. Comments suggest a lack of knowledge existed amongst students of any outside support that had been received. The past student demonstrated an awareness that support was expected to have been received but they were unable to articulate in what form that support was received.

IBO Support

The category labelled *IBO Support* describes support received from the International Baccalaureate Organisation during the piloting of SEHS. Based on the data presented in Table 4.12, this support consisted of; communication with those who were responsible for syllabus development, and assistance provided by the IB curriculum and assessment centre (IBCA). Evidence relating to support received from the IBO were supplied predominantly by staff members at the site, however it

was apparent that students were aware teachers were in communication with the IBO in some capacity.

Table 4.12. Evidence for category description – IBO support

Participants evidence
Coordinator: *From outside the school? The only support we get is from the IB, you know the... IBCA, they're very protective about their courses anyway so you're not going to get a whole lot of support from anywhere other than there and we've had that through, you know, through training workshops and... Teacher B's involvement in the sort of steering committee in Cardiff. We haven't any other specific support from the regional offices and... the only other support would be from other pilot schools in the program and...*
Teacher A: *I know Teacher B has gone over to the UK a couple of times for meetings on this pilot. So there would be support for him through that, but as it is a pilot we don't have the professional development that the other subjects have at this point in time.* ***Teacher B:*** *I mean that's mainly from the IB. Just in terms of I guess, initially being invited to attend the curriculum review meeting. And then this year attending... being invited to attend the... being invited to attend a paper editing meeting, would probably be the main things outside the school.*
Student A: *Oh yeah, definitely, I mean if we ever have a question, you know, something that our teacher doesn't know or is unsure of, we just send off an email to the IBO and they, you know, they have plenty of people with masters in sports science or PhD's and you know, that are better references, so they help answer our questions, and that„s really been invaluable, because, you know, most classes I don't think in the HSC you would have, you know, the sort of office, where you can just send off a question and you know that you're getting a Phd's ideas on it.*
Past Student: *No evidence*

Data presented in Table 4.12 provides evidence to suggest that the International Baccalaureate Organisation has provided support during the implementation and that this support has assisted the school in the piloting of SEHS. In particular it is evident in comments from coordinator and teachers that outside support that was received came only from within the International Baccalaureate Organisation. As students were predominantly unaware of outside support, they provided only limited data was in this category.

Limited Outside Support

The category labelled *Limited Outside Support* describes the finding that apart from the support provided by the IBO, limited outside support is available to those the piloting of SEHS. Lack of professional development for those teaching the subject is an issue. This theme was evident in extended responses provided by staff teaching SEHS at the research site and in some cases the same excerpt of interview data is provided as evidence for more than one category as is the case for the IBO support presented in the previous category. This indicates the distinct and interdependent nature of the analysis process.

Table 4.13. Evidence for category description – Limited Outside Support

Participants evidence
Coordinator: *From outside the school? The only support we get is from the IB, you know the... IBCA, they're very protective about their courses anyway so you're not going to get a whole lot of support from anywhere other than there and we've had that through, you know, through training workshops and... teacher B's involvement in the sort of steering committee in Cardiff. We haven't any other specific support from the regional offices and... the only other support would be from other pilot schools in the program...*
Teacher A: *I know Teacher B has gone over to the UK a couple of times for meetings on this pilot. So there would be support for him through that, but as it is a pilot we don't have the professional development that the other subjects have at this point in time. So, in answer to your question there is limited support from outside the school to my knowledge.* *So if that average PDHPE teacher is in your school and they are not competent or happy, or comfortable to be able to (sic) going into more depth Well then you probably wouldn't be doing it cause there is no outside support.* ***Teacher B:*** *I mean that's mainly from the IB.*
Current Students: *No evidence*
Past Student: *No evidence*

Data in Table 4.13 provides evidence that whilst the outside support was provided by the IBO, it was apparent that there is little other outside support available. The coordinator did, however, give an indication that support had been received through communication with other IB schools involved in the piloting (This is described in the category *Professional Communication*). Comments made by teaching staff indicate

that there is lack of professional development available at this stage for teachers of SEHS. Further comment from one teacher indicated that support came ‗mainly from the IB' as opposed to other outside sources. No evidence for this category was provided from student participants due to a lack of awareness of support received.

Professional Communication

The category labelled *Professional Communication* describes communications with other schools piloting SEHS and staff member involvement in meetings at the IBO headquarters in Cardiff, Wales as valuable sources of outside support during implementation. Based on data found in Table 4.14, professional communication involved regular contact with other teachers involved in the piloting, and a sharing of ideas and resources.

Table 4.14. Evidence for category description – Professional Communication

Participants evidence
Coordinator: *... the only other support would be from other pilot schools in the program and...* *There's been a lot of communication between... between schools. Teacher B equivalent in all the schools have regular... have regular contact maybe through email and the... the online curriculum centre.* *I bel... I believe so, I mean I sometimes... initially I would get the email from the... from a particular teacher in a school, in Canada, or wherever and they'd ask me to pass on their information or pass on their email or inquiry to the representative in the school. But now that they all know each other and more and more schools have come online I think it's a very much a mutual support group now. Which I think is what's intended in the initial pilot phase anyway.*
Teacher A: *I know Teacher B has gone over to the UK a couple of times for meetings on this pilot. So there would be support for him through that, but as it is a pilot we don't have the professional development that the other subjects have at this point in time.* ***Teacher B:*** *Well just as I said, meeting... meeting with colleagues, you know, sharing ideas face to face rather than online. I guess developing relationships with other people who are teaching the course so that you can... if you do have a question you can ask a colleague. I mean the OCC's great because you can post a question and anyone can answer it but it's nice to have that relationship*

with another teacher who's teaching it, who you can just shoot and email and get a quick response cause you've developed, you know, a relationship/rapport with that person. *Yeah sharing ideas, I mean you know you can post examples of work on the... on the OCC, which is useful. But also just when meeting... meeting at... well at the meetings in Cardiff sharing ideas, discussing different ideas... you know, getting recommendations in terms of what text book people are finding the most... the most user friendly, because I mean not all con... most of the textbooks are written for A-level, so you want a text book that's covering a lot of your content with not too much extra that you're paying for that you don't need. If you like*
Current Students: *No evidence*
Past Student: *No evidence*

Data presented in Table 4.14 provides evidence to suggest that communication with colleagues at other IBO schools was viewed by staff as a valuable source of outside support during the implementation process. The Coordinator and the teachers made references to the sharing of resources, in particular through the use of the Online Curriculum Centre (OCC), as being a beneficial form of support. It is also evident in the data that this communication and sharing of ideas lead to the development of professional relationships between staff at the pilot schools during implementation. There was no evidence provided by the students for this category.

In summary, the data analysis and results provided emergent categories that answer the third research question: **From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Outside Supports?** Results reported provide evidence for the creation of the four specific categories: *Student Awareness; IBO Support; Limited Outside Support; and, Professional Communication.* These four specific categories to emerge from the data describe outside support received by participants' experiences of support received from outside the school community during the implementation of SEHS at the research site. Coordinator and staff responses indicate that support had been received from the IBO during the piloting of SEHS. Staff comments however, also indicated that, on the whole, support had been limited, particularly in respect to professional

development for teachers. Professional sharing of ideas and resources with colleagues at other pilot schools was mentioned as a form of outside support that had been noted and useful during implementation. The interview data from students in particular demonstrates little awareness of any support being provided from outside the school.

The previous sections in this chapter are dedicated to the examination of the three constructs suggested by Rogan and Grayson (2003). As such the results reported in these sections assist in answering the major research theme: What is the alignment between the conceptual framework for curriculum implementation (Rogan & Grayson, 2003), and the processes of implementation of SEHS at the research site? The results presented thus far, suggest that the conceptual framework for curriculum implementation discussed in chapter three provides a comprehensive model for the examination of the implementation process of SEHS at the research site. The use of the three constructs allowed for the detailed examination of participants' understanding of SEHS as a subject, illumination of those factors which had assisted or hindered the implementation process at the research site, and the identification of outside support that had been received during the piloting. These results provide depth and detail of the implementation process as theorised by Rogan and Grayson (2003). To extend this understanding of curriculum change, what holistic advice can the multiple groups of the pilot site provide to other schools contemplating implementation of the SEHS in their schools?

ADVICE FOR OTHER SCHOOLS

The final section seeks to answer the final research question**: Based on the experience of piloting of SEHS curriculum what advice would the participants at the research site provide to other schools contemplating enacting SEHS?** Based on participants' responses to this interview question, six specific categories were identified and labelled, namely*: Teaching Staff; Facilities and Equipment; Teacher Preparedness; Resources; Subject Promotion; and, Positive Attitude toward Implementation.*

Teaching Staff

The category labelled *Teaching Staff* describes the need for teachers of SEHS to be enthusiastic about the subject and suitably qualified to teach it. Based on the data found in table 4.15, qualifications deemed necessary were those specifically relating to the sports science field. The importance of staffing in implementation was reflected in suggested advice from each of the participant groups.

Table 4.15. Evidence for category description – Teaching Staff

Participants evidence
Coordinator: *well obviously they would have to have... good, very good capable trained staff. That... That's... that would be a must. You couldn't just expect a PE, you know any PE teacher or any science teacher or whatever to be in a position to... to... to teach the course. I think the course, because of its nature, and because it's well above any high... any existing high school course in terms of difficulty and scope. I think... I think the person would have to be a particularly, a particularly strong, you know, even academic sort of... science, physical education sort of teacher, or will have been perhaps a physiotherapist or something like that, that would be an ideal benefit.*
Teacher A: *I think further to my last answer, make sure the teachers are motivated to teach it and up to teaching it, in terms of their knowledge base.* ***Teacher B:*** *...you know, you need a teacher who is probably you know, enthusiastic, prepared to you know, try something different.*
Student B: *Just one, have back up teachers, cause you don't want a substitute teacher just going through making the students learn by themselves cause I think that you need- like if you don't understand something clearly there's no point- you need to understand, exactly what it is* ***Student C:*** *Make sure you have a good committed staff willing to go find out more for you and, know what's going on a bit.*
Past Student: *In terms of teacher; just do your research. I mean there is a lot of content to cover, and you know as I said before teachers are fundamental, like a good teacher is fundamental to how good a course goes. So you know, it depends... you really need a teacher who knows what he is doing at all times ...there was a lot of things that often needed to be explained in the fine, like there was a lot of terms and like concepts that if you just looked at on paper you are not really going to understand it. So, you know, it, you... a lot of times when you read it for the first time, the first thing you are going to do is "Sir I don't understand this concept or this term and can you elaborate", and, you know, if you're not going to have a good teacher to do that, the kids aren't going to absorb or you know, learn as much as they can so.. .*

Data presented in Table 4.15 provides strong evidence that participants recommend schools looking to implement SEHS need to have well qualified and motivated teachers to deliver the subject. Coordinator and teachers both refer to the need for SEHS teachers to be knowledgeable in the area of sports science due to the depth of content covered in the subject. Comments from student participants suggest that good teachers are fundamental to the success of a subject.

Facilities and Equipment

The category labelled *Facilities and Equipment* describes a requirement for schools to possess appropriate facilities and/or equipment in order to offer SEHS. Based on the data presented in Table 4.16, these include facilities in which to conduct experiments (gym, weights room, pool) and the necessary equipment to conduct those experiments (heart rate monitors, blood pressure readers, and scientific lab equipment). Members of each participant group mentioned the need for appropriate facilities.

Table 4.16. Evidence for category description – Facilities and Equipment

Participants evidence
Coordinator: *You would need to have some reasonable facilities in the school. You couldn't hope to cope if you just had a normal run of the mill physical education department. I don't think you would have the necessary equipment or... to adequately teach the course. And certainly not even just having any normally equipped science laboratories would be enough either. I think you do need some specialist equipment.* *No... I know some specialist... measuring equipment is certainly vital. I know we've... we've purchased quite a bit of that for our new facility to... and that's for use with all the athletics... the elite athletes as well, and sportsmen in general... and so I think... I think facilities are another important aspect. I think apart from those two, If you've got the... the right sort of kids to do the course then I think you'd be... you could be up and running and have a really successful program.*
Teacher B: *what else... resources, you know, the school... the school would need to spend money on resources of some sort. You know, at least you know, heart rate monitors, blood pressure monitors, just some basic items that students can use to develop labs...*
Student A: *Yeah well I think facilities are, you know, pretty big point because here at (research site) we have, you know, really good athletics facilities, you*

know, brand new track and the really you know, controlled area type work-out room, but, you know, I understand that a lot of schools don't really have facilities, they're... they aren't that lucky, so, you know, I really think the equipment makes a big difference through it. Cause if you end up having to you know, do... if you're doing centre of gravity or something and you know it's like balancing a broom or something instead of being able to go use a machine or a balance ball in the weight room, I think that would really take away from the subject.

Student C: *The facilities, scientific equipment... probably more than a slide show*

Oh, things like a gym, a pool if you want some experiments in that sort of area, basketball courts...

Past Student: *In terms of conducting the experiments, I mean a lot of times, I think schools, I mean it didn't happen to us but, I think schools should look at whether they have the capability of letting students conduct, you know, sports, exercise and health science experiments. I mean there's no point learning about the cardiovascular system or, you know, you muscular system if you're not going to have the right equipment or right facility to allow kids to learn about them in, in experiments. So....*

Equipment, facilities... again

In all of my experiments I pretty much needed you know, very specific gym equipment or you know, heart/blood pressure equipment, so, yeah all facets of experiments we needed the right things.

I mean pretty standard gym equipment. I mean treadmills, bikes, a weights room, heart rate monitors, blood pressure readers. Yeah just really standard indoor gym equipment.

Data presented in Table 4.16 provides evidence that strongly suggests participants believe that it would be beneficial for schools to have adequate facilities and some specialist equipment to deliver the subject. Specifically comments highlighted the need for appropriate facilities to conduct lab experiments necessary in the teaching and learning of SEHS. Participant responses from both staff and students indicted the view that the facilities and equipment were important in the delivery of the course content. This category provides further evidence regarding the importance of facilities alongside comments made in response to the earlier question about factors that had assisted implementation (Table 4.6).

Teacher Preparedness

The category *Teacher Preparedness* describes the necessary work teachers need to be willing to put in order to be; up to date with curriculum developments; have a strong knowledge of subject content; and prepare their own resources to be used in the delivery of the subject.

Table 4.17. Evidence for category description – Teacher Preparedness

Participants evidence
Coordinator: *No evidence*
Teacher A: *I think further to my last answer, make sure the teachers are motivated to teach it and up to teaching it, in terms of their knowledge base.* ***Teacher B:*** *... you know, you need a teacher who is probably you know, enthusiastic, prepared to you know, try something different.* *I mean, you know, ask heaps of questions from the IB, you know, try to develop, you know, a support network, you know, be prepared to do the hard work in terms of developing resources from scratch and probably... definitely have to do some study to brush up on your own knowledge if you haven't used it since university. You know, just be, I guess, positive about the subject, as in you know, take a good attitude into the subject with your students, encourage your students to ask questions and... and do their own research, which is sort of part of the IB way. Students really need to, you know, develop a passion for the subject, and... and dig a bit further and do a lot of their own research and be independent learners, in a way.* *I think so because I mean if you're not teaching a lot of the content regularly, you certainly need to brush up on your content before teaching it.*
Student B: *Probably organisation, you'd probably like just have the lessons ready to go... cause I'd- I'd like- teachers always say like, sometimes they like, maybe wing it, well I dunno if they say it, but maybe teachers can try and wing a lesson, you know... But I don't think in this subject, I don't think you can do that. Whereas you gotta be, you gotta be on the ball.* ***Student C:*** *Make sure you have a good committed staff willing to go find out more for you and, know what's going on a bit.* *Well, for example, like going overseas to the board conferences to find out what's going on, what's new, for example this year, I think they've reviewed that guide, syllabus once or twice. So just making sure you keep up to date with that stuff.*

Past Student: *In terms of teacher; just do your research. I mean there is a lot of content to cover, and you know as I said before teachers are fundamental, like a good teacher is fundamental to how good a course goes. So you know, it depends... you really need a teacher who knows what he is doing at all times.*

Well, the amount of content that was covered in the syllabus, there was a lot of things that often needed to be explained in the fine, like there was a lot of terms and like concepts that if you just looked at on paper you are not really going to understand it. So, you know, it, you... a lot of times when you read it for the first time, the first thing you are going to do is "Sir I don't understand this concept or this term and can you elaborate", and, you know, if you're not going to have a good teacher to do that, the kids aren't going to absorb or you know, learn as much as they can so.. .

Data presented in Table 4.17 provides evidence to suggest that a teacher who is about to start teaching the subject for the first time would need to be well prepared in terms of their knowledge of the content. Teachers currently involved in the teaching of the subject made comments indicating that any teacher looking to teach SEHS would need to be willing to put in the work necessary to develop resources to assist with the delivery of subject content. Students also placed emphasis on the need for the teacher to be organised and prepared to deliver lessons. Evidence from the past student highlighted the need for the teacher to have the knowledge to explain content to students in detail. No relevant comments were identified as being provided by coordinator for this category.

Resources

The category labelled *Resources* describes a requirement on the part of the teacher to prepare resources to assist in the teaching of SEHS and source useful textbooks to aid with the delivery of the subject. The past and current students commented on the need to have appropriate resources for learning and these data are presented in Table 4.18.

Table 4.18. Evidence for category description – Resources

Participants evidence
Coordinator: *No evidence*
Teacher B: *I mean, you know, ask heaps of questions from the IB, you know, try to develop, you know, a support network, you know, be prepared to do the hard work in terms of developing resources from scratch* *Well I just think you know, definitely if there"s conferences available, you know, go to the conferences to find out more about it... you know get resources... good resources. Get a range of text books...*
Student C: *... definitely make sure you have the resources to go through with the subject.* *Well, with a lot of other subjects you get loaded up with your textbooks and the knowledge seems a bit more formal, formalised, whereas in sport science in its pilot course it comes across a bit more... ah not as formal and a bit more fragmented, you have to do a fair bit of research to figure things out for yourself.* *yeah probably. Like it definitely helps if we just, we do have the syllabus guide, but it doesn"t give you any actual content you have to go find the content once you"ve read the syllabus point. If there was an actual textbook of just everything in it, that was specifically made for the course, then would definitely help a lot.* *No, there... we have a range of textbooks that as a general rule they"ll cover most of what we need, but they"re not specifically designed for the course*
Past Student: *Other things would be getting a relevant textbook. There might not be one that is specifically written for this course but I"m sure there are other textbooks out there that cover a lot of relevant content that can be used and I think that would definitely help the kids.*

Data presented in table 4.18 provides evidence that having good resources to assist learning would be useful, in particular a textbook specifically written for SEHS. Advice provided by Teacher B included the need for the teachers to be willing to develop their own resources to assist in the delivery of content. Comments from one current student and the past student bring attention to a need for a subject specific textbook to be available to students studying SEHS. No comments emerged from the data of the coordinator that was identified as relevant to this category.

Subject Promotion

The category labelled *Subject Promotion* describes the need for the school to actively promote the subject during the initial stages of implementation in order to attract students who may be interested in studying SEHS and be capable of success. Based on the data found in Table 4.19, the subject is considered one which is quite academically demanding. The need to actively promote the subject in order to ensure the viability of the subject was mentioned by both staff and students at the site.

Table 4.19. Evidence for category description – Subject Promotion

Participants evidence
Coordinator: *... If you've got the... the right sort of kids to do the course then I think you'd be... you could be up and running and have a really successful program.*
Teacher A: *It's got to be advertised and encouraged in the lower years in terms of the PE course, and a bit of an identification of kids who would be up to doing it, have the brains to do it, need to target those boys or girls.*
Student A: *Make sure that, you know, new students coming in, that they're aware of the specifics of the program because I know when I came in I actually wasn't sure what type of science this would be. I think it's, it would be a good idea for them to know, to tell the students looking at it:- This is an interdisciplinary course covering these, these, these subjects and you know this is what we do to apply it. Because that was actually something I was really unsure of when I came in. I ended up taking chemistry as another subject just to make sure that I wasn't taking, you know, some waffly science course. But once I found this was really a legitimate course, I dropped chemistry and picked up another one, another class that I liked more.* *I went through all the descriptions, you know, really carefully before choosing my subjects, and the sports science one did seem vague and I think that would definitely, you know, push people off the trail rather... and go for you know, a more familiar standard subject like biology or physics.* ***Student C:*** *Oh, one, it's a lot harder than it seems. Don't go into it thinking it's a bit like PE or... and think it's definitely a science, you do conduct experiments go think through scientific method, it is a lot of fun but it's also a lot of work.*
Past Student: *no evidence*

Data presented in Table 4.19 provides evidence to suggest that participants would advise schools to promote the subject in order and to provide students, new to SEHS, with the information necessary to know if it is a subject that they would like to take. Students emphasised the need for promotion to comprehensively inform new students of what was involved in studying the subject and to make them aware SEHS is a legitimate science based subject. Coordinator and teacher comments were related more to the promotion of the subject to attract capable students who would be suited to the subject.

Positive Attitude toward Implementation

The category labelled *Positive Attitude toward Implementation*, presented in Table 4.20, describes the overall sentiment that those involved in the piloting of SEHS at the research site would encourage other schools to offer it if they have the staff, facilities and students that would make it a viable option.

Table 4.20. Evidence for category description – Positive Attitude toward Implementation

Participants evidence
Coordinator: *I would say... I would advise them to go all out, to try to offer it if they possibly can. I think it"s... as soon as they became aware of the content of the course, and now that the actual materials are all up on the OCC. I think, they would be impressed, as impressed as we have been with the... with the course in general. And I think they"ve probably seen now, or some would have seen some of the exam papers and how it"s being assessed and I think once word spreads even more I"m sure there will be a lot more schools wanting to come on board because there as so many schools now in a similar situation to ours, who have the expertise, the staff, the facilities to... and... and the sort of student who would benefit greatly from the course so, I would... I would simply advise all... all schools to take a good look at the course and... and see if it does, you know, have a place in their curriculum, because I think there would be very few schools who could say it wouldn"t.*
Teacher B: *Well I think it"s a fantastic course. I would encourage other schools to take it on in 2012 when it comes on... because it becomes a mainstream sort of subject. Just because it is a scientific study of sport, it is quite rigorous. You know, not wanting to discredit the HSC, it does go into a lot more depth. Students tend to be more interested in the sport side of the course, which this course is all sports science, whereas with the HSC half of the course is devoted to health which boys, in particular, aren"t necessarily interested in. So I mean and because it is a science... well being an all boys school for boys to achieve more because, you know, it"s... the... the questions*

don't require essays so it's good for boys in that sense.
Student A: *Yeah definitely, you know, this is actually the favourite science course I've taken, you know, in my you know, educational career because, I'm really a hands on learner and you know, this course address that really well.* ***Student C:*** *Definitely the... all the scientific process we have to go through when we're doing our, writing up our experiments, ...there's a fair few, there's also a fair few restrictions on the experiments you can do such as there's things about fluids, so we can't do, a lot of things, I was thinking when I was planning on doing the subject, ... oh cool, you get blood tests or... that sort of stuff, there are restrictions on that sort of stuff you can still do a lot of fun stuff though...*
Past Student: *No evidence*

Data presented in table 4.20 provides evidence to suggest that there was generally a positive feel towards the subject and the implementation of SEHS amongst those involved in the research site. Staff members involved suggest that it is a course that they would recommend to other schools. Student comments refer to their enjoyment in studying SEHS based on their experience.

In summary, this section has answered the research question: **Based on the experience of piloting of SEHS curriculum what advice would the participants at the research site provide to other schools contemplating enacting SEHS?** Results reported in this section provide evidence of six specific categories: *Teaching Staff; Facilities and Equipment; Teacher Preparedness; Resources; Subject Promotion; and, a Positive Attitude toward Implementation.* Data provided by participants suggested that schools looking to implement SEHS in the future should ensure they have teachers with the knowledge and skills capable of delivering the content, the facilities and equipment and resources required to assist with teaching and learning. Evidence suggests that teaching staff also need to be well prepared to provide an active promotion of the subject. These factors are important in attracting enough students to make offering the subject viable. Overall there was a positive view expressed by all groups towards the introduction of SEHS into the Diploma Programme.

SUMMARY

In this chapter specific categories emerged from participants‘ responses to six interview questions. These results have answered the research questions proposed in chapter three. A summary of the key findings reported in the four sections of this chapter is as follows:

Profile of Implementation

- SEHS is an interdisciplinary science subject
- SEHS provides a broader science alternative to other Group 4 subjects
- SEHS is a subject which provides pathways to future careers and/or tertiary study
- There is a demand for the inclusion of SEHS

Capacity to Innovate

- A lack of subject specific resources, particularly a textbook has been a challenge
- Having access to excellent facilities has helped in teaching and learning
- Having the support of the school, particularly financial support, has assisted
- Developing the initial interest to run a new subject has been a challenge
- Having the subject limited to a Standard Level offering has been a challenge
- Teachers play a central role in successful implementation

Outside Support

- Students were largely unaware of outside support provided
- IBO provided support during implementation
- Limited outside support was available, especially professional development
- Professional communication with other pilot schools did occur and was useful during implementation

Advice to Other Schools

- Ensure capable and committed teaching staff are available
- Appropriate facilities and equipment are necessary
- Teachers need to be well prepared for teaching the subject

- Teachers need to locate or create resources for teaching and learning
- SEHS needs to be actively promoted to attract enough student interest to run the subject
- There was a positive attitude towards the implementation of SEHS at the research site

This concludes the results of the data analysis. Chapter Five will present an examination of each of these findings in relation to existing literature on curriculum implementation and provide a discussion of the results highlighted in this chapter.

CHAPTER FIVE

DISCUSSION

Curriculum change has been identified as a dynamic and complex process. With the literature (Fullan, 2007, 2008; Rogan & Grayson, 2003) identifying that in order for curriculum change, and in particular curriculum implementation, to be successful an understanding of how this process occurs is important. Successful curriculum implementation, such as the introduction of a new subject into an existing program of study, is reliant on a number of factors including; an understanding of and a need for the change, the schools ability to implement the change and the provision of external support during implementation. This study provides support for the findings of existing literature and identifies some additional potential issues specifically related to the introduction of SEHS into the IB Diploma Programme.

Based on the model of curriculum implementation of Rogan and Grayson (2003) this chapter discusses of the results presented in the previous chapter and links the findings to the literature relating to curriculum implementation. This chapter is divided into four sections, one addressing each of the four research questions.

The first section discusses the findings from the research question related to the construct *Profile of Implementation*; the second section relates to *Capacity to Innovate;* and the third section presents a discussion on the findings *Outside Support.* These three sections relate to the research theme of the degree to which the process of implementation of change aligned with the conceptual framework for the study. The last section relates the findings final of the final research question concerning *Advice to Other Schools* that participants at the pilot school provided. Each of these sections concludes with the identification of a set of suggested indicators for each of the three constructs, linking the findings to the Rogan and

Grayson model and the conceptual framework for the study. Table 5.1 provides an explanation of the origin and purpose of three key terms discussed in Chapter 5, namely constructs, categories and indicators.

Table 5.1. Origin and purpose of terms; Constructs, categories and indicators

Term	Origin	Purpose
Constructs	Rogan and Grayson (2003)	Provide a conceptual framework for the investigation and analysis of data
Categories	Created as a result of the inductive analysis of data.	Summarise findings from the process of inductive analysis
Indicators	Suggested as a result of the findings of the study	Provide a means by which to link the findings of the study back to the Rogan and Grayson (2003) model of curriculum implementation.

PROFILE OF IMPLEMENTATION

A primary aim for this research study was developing an understanding of the degree to which the Rogan and Grayson‘s (2003) theoretical model of curriculum implementation framed the processes experienced at the Pilot School. The first part of that research was to investigate the *Profile of Implementation* by investigating the purpose or purposes of SEHS from the perspective of those involved in the pilot of the subject at one Australian secondary school. A general consensus was found across all participant groups regarding their understanding of SEHS as a subject. Four specific categories of understanding emerged from the data, related to SEHS being an: *Interdisciplinary Science; Alternative Science Subject; Pathway Subject;* and *Demand for Inclusion*. These results are now discussed.

Interdisciplinary Science

A consensus view of SEHS was found at the research site. This view described SEHS as a science subject which incorporates aspects of the more traditional science disciplines (Biology/Chemistry/Physics) and applies them in a sport and exercise context. Furthermore both staff and students made specific reference to the subject being one which involved practical work and laboratory experiments.

Evidence also indicated that the SEHS subject was viewed as a ‗broader‘ study of science. The alignment between staff and student understanding of the nature of the subject, suggests that there was clarity in participants‘ understanding of the nature of pilot subject and by inference change to curriculum. This was evident when comparing participant responses to interview questions related to the subject with the SEHS Draft Syllabus (IBO, 2009) course description, namely,

> *"The course incorporates the traditional disciplines of anatomy and physiology, biomechanics, psychology and nutrition, which are studied in the context of sport, exercise and health. Students will cover a range of core and option topics and carry out practical (experimental) investigations in both laboratory and field settings. This will provide an opportunity to acquire the knowledge and understanding necessary to apply scientific principles and critically analyse human performance".*
>
> (IBO, 2009, p. 5).

The emergence of a category from the data illustrating a shared understanding of the nature of the subject which aligns to the syllabus provides evidence that there is a high level of consistency at the research site in terms of the intended nature of the subject.

The presence of a congruency in the perceptions of participants pertaining to the nature, purpose and goals of SEHS is important for three reasons. Firstly (Fullan, 2007) has previously described that clarity about the goals and means of a curriculum change is important if implementation of curriculum is to be successful. The importance of a shared understanding surrounding the nature of the subject being implemented was also highlighted by Halbert and MacPhail (2010). In a discussion of the implementation of a revised senior cycle physical education syllabus in Ireland Halbert and MacPhail (2010) suggest that implementation would be more likely successful if school staff were provided with opportunities to learn about the syllabus and the implications of its implementation prior to the introduction of the subject at the school. Secondly Cohen, Raudenbush and Ball (2003) found

that successful introduction of a curriculum document depends upon the ability of its users to effectively implement it. Thirdly, the extent to which the ideals of a curriculum change are put into practice was identified as one of the three constructs in Rogan and Grayson's (2003) model of implementation. In this model it is recognised that any curriculum change may be interpreted and implemented differently in the classroom. The findings of this study suggest SEHS is perceived as being delivered and implemented as an interdisciplinary science in a manner congruent with syllabus descriptions sourced to the draft syllabus.

Alternative Science Subject

SEHS was viewed by participants in the study as a subject that provides an alternative to the other Group 4 science subjects. Description of this category included SEHS as a subject choice perceived as: less demanding; attractive to students who may not have otherwise chosen to undertake the Diploma Programme[13]; providing more educational opportunities and variety for students and student interests; and, filled a gap that had existed in the Diploma Programme curriculum. For example, students expressed the view that the subject provided a good alternative for students who previously would have had to choose one of the traditional sciences (Biology, Chemistry or Physics) as well as a subject for those students interested in the sports science area of study.

This category provides strong evidence that the implementation of SEHS at this school was viewed as a curriculum change for which a need existed as it provided a desirable alternative study option that was previously unavailable. Fullan (2007, p. 89) suggests that the fit between the curriculum change and the school's needs is essential if curriculum implementation is to be successful. The emergence of this category from the data provides further evidence that a "fit" between need and subject may be an important factor influencing the success of implementation. It is therefore suggested that if a school is in need of an extra subject choice to cater for

[13] Students at the research site have the choice of studying the HSC or the IB Diploma Programme in their final two years of schooling.

the needs of their students then the implementation of a subject like SEHS is more likely to be successful.

Pathway Subject

There was strong evidence in the data that one of the perceived aims of SEHS was to provide a pathway to tertiary study and/or future careers. In particular there was a view that the purpose of the subject was to provide a lead into tertiary study or careers in industries related to sports science. Specific reference was made regarding entry into university courses (e.g. medicine and medical sciences, physiotherapy, and sports science) or careers in the sports and exercise industry (e.g. Physiotherapy, fitness training, personal training, sports coaching, sports scientist).

Other studies investigating the introduction of a new subject into an existing curriculum program have illustrated the importance of the subject being recognised as leading to tertiary study and/or career options. In a study of the introduction of AS/A level Critical Thinking in the United Kingdom, Black (2009, p. 27) concluded that it was important for the new subjects to be perceived as a course that is recognised for university entry if they are to be accepted as worthwhile study options. This claim is also supported by Tudball (2005) who stated that students studying the IB typically opt to take subjects if they view them as vocationally valuable. Another study by Yueh (2007) suggested that the gaining of status as a subject which leads to an academic discipline can affect the emergence of new subjects in the school curriculum. The existence of a view that SEHS is a subject that leads to a tertiary or career path is therefore important in the subject gaining the status it needs to co-exist amongst the other subjects and obtain the necessary curriculum time in the school timetable. The importance of the link between subject content and its real world applications was also recognised by Rogan and Grayson (2003) who suggested that the strength of this link is important indicator by which to gauge the success of implementation.

In the context of introducing an optional subject choice for students within the Diploma Programme, it is suggested that the view that SEHS provide pathways into tertiary study or careers in related industries could be an important factor in the success of its introduction. This factor is particularly relevant as SEHS is studied in the final two years of secondary schooling when students make subject choices based on career orientated decisions.

Demand for Inclusion

This category describes the view that a demand clearly existed for the inclusion of the SEHS at the research site. The data suggests that this demand existed on two levels. The first being a demand related to student interest in the subject area and the second related to the general interest in the study of sport science within the wider educational community. A general consensus amongst both staff and students that the subject had been well received and that it was proving popular with students at the research site clearly illustrates that student demand for the subject was present within the school. However it was also evident that a demand existed on another level due. Demand was linked to the increase worldwide in studies in sports science and the need for the IB to offer a subject that is comparable with those offered in local curriculums not just in Australia but around the world. The emergence of this category from the data provides further evidence that the implementation of SEHS is viewed as a curriculum change that is needed by those who have been involved in the piloting. It is therefore suggested that within *Profile of Implementation* there may be the need to include an indicator relating to whether a demand for the change exists, particularly in cases such as this where the new subject is an optional choice schools can make to include in their curriculum offering of the Diploma Programme.

In summary, this section has provided a discussion of the results and the literature relating to the research question: **From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Profile of Implementation?** In this

study, the construct *Profile of Implementation* was informed by Rogan and Grayson's (2003) description for *Profile of Implementation*. That is, —an attempt to understand and express the extent to which the ideals of a set of curriculum proposals are being put into practice" (p. 1181). Based on the specific categories that emerged from this investigation of the introduction of SEHS at one Australian secondary school, three indicators for this construct are suggested. These indicators for *Profile of Implementation* are:

- **understanding** – shared understanding of syllabus document by coordinator, teachers and students
- **value** - SEHS as a pathway subject linked to tertiary/career opportunities
- **demand** – SEHS was in demand by both students and staff

These three indicators highlight important considerations for schools looking to offer SEHS as part of their Diploma Programme in the future.

CAPACITY TO INNOVATE

Another of the aims of the study was to develop an understanding of the factors that had assisted or hindered the implementation of SEHS at the research site. Differing perspectives were provided depending on participants' individual experiences and levels of involvement with implementation. Factors relating to a more administrative level were discussed by staff members whereas students provided valuable insights into factors that had affected implementation from a classroom involvement perspective. Six specific categories describing assisting/hindering factors emerged from the data, namely: *Resources; Access to facilities; School Support; Student Interest*; *Standard Level;* and, *Teachers.* These are now discussed in turn.

Resources

The lack of subject specific resources, in particular a textbook specifically written for SEHS, was identified as a challenge during the piloting process. This related in particular to difficulties faced due to the lack of textbook specifically written for

SEHS[14]. Challenges existed for staff in terms delivering the syllabus content without the guidance of materials to support the curriculum; and for students it posed difficulties with the learning and revising of subject content. It was evident that this problem did not stem from an inability on the part of the school to provide these resources; instead these problems arose out of the fact that, at present, subject specific resources do not exist for SEHS. In the absence of more formal resources reference was made to one teacher who created slide shows as a tool that had been used in the delivery of the content. Despite the efforts of the teacher to supply students with resources, the lack of a set textbook for SEHS was clearly an issue during implementation. Textbooks assist in guiding teachers on what needs to be taught as well as how to teach subject content (Chambliss & Calfee, 1998, p. 13). Therefore, access to textbooks and subject resources emerged as an important factor affecting implementation.

The emergence of a category emphasising the importance of a subject specific textbook is consistent with the findings of other researchers investigating curriculum implementation (Sun, 2007; Yueh, 2007). In reviewing literature related to the emergence of new subjects, Yueh (2007) suggested that textbooks contribute to the emergence of new subjects in schools; and that:

> *"subject status is higher and more stable when there is a subject textbook to support the teacher and student with the teaching and learning in schools" (Yueh, 2007, p. 63)*

A case study of implementation in Taiwan (Sun, 2007) found that textbooks assisted in both teaching and learning and that the availability of resources was viewed to be a limiting factor in implementation. The availability of resources was also identified by Rogan and Grayson (2003) as having an influence on the schools *Capacity to Innovate,* illustrating how implementation may be affected depending on the quality and availability of textbooks and adequate curriculum materials. It is therefore

[14] Comments were made that textbooks had been used by the school however none were written for the content of the SEHS syllabus.

suggested that a lack of subject resources can be a limiting factor during implementation of a new subject.

Access to Facilities

Participants in the study were acutely aware that the school possessed excellent facilities for teaching and learning. This was evident in comments from participants in each of the groups which suggested that the school‘s high quality facilities had been an assisting factor during the piloting of the SEHS at the research site. Facilities were identified as having played a large part in enabling students to carry out practical experiments and laboratory work in controlled environments, an essential component of the SEHS syllabus. Specific facilities which were identified as assisting implementation included the fitness centre, fitness laboratory, gym equipment, science laboratories, and the school‘s indoor running track. It is acknowledged that the research site possessed facilities that are possibly superior to that of most schools; the emergence of this category does highlight the importance that access to facilities plays in the implementation of SEHS.

These findings, suggesting that access to high class facilities assists in implementation, are congruent with those identified by MacPhail and Halbert (2005) in Ireland, and Rogan and Grayson (2003) also identified the manner in which a school‘s physical facilities are configured may affect implementation.

Physical facilities were identified as an indicator within the construct *Capacity to Innovate* and it was suggested that the level of facilities available had an influence on how successful a school might be in implementation of curriculum change. In the context of the implementation of SEHS this evidence provides support for the suggestion that access to appropriate facilities for teaching and learning is a factor affecting implementation. More specifically the findings of this study illustrate how the possession of facilities of a high quality acts an assisting factor in the implementation of the subject.

School Support

School support in the form of support from the school council and school executive was identified as another factor that had assisted in introducing SEHS at the research site. Evidence suggested the school had been very supportive through the piloting of SEHS especially in terms of the financial costs associated with the introduction of a new subject. Support was explained to include; allowing for teaching staff to take time off to attend curriculum steering meetings abroad (a cost to the school not only in terms of travel costs associated but also in the replacing of the teacher whilst absent), and the significant cost to the school of staffing a subject which initially had only a small number of students. It was recognised that without this support from the school, they would not have been able to introduce the subject.

There was also a suggestion made that convincing a school council or principal that it is financially viable to initially run a subject with small numbers may be a challenge faced by other schools. Fullan (2007) identified the support of the principal as necessary for effective implementation stating that

> *"The principal is the person most likely to be in the position to shape the organisational conditions necessary for success" (Fullan, 2007, p. 96).*

Halbert and MacPhail (2010) also acknowledged the importance of securing the support of the principal during implementation explaining this support to be essential in securing the resources to effectively implement syllabus changes. The evidence suggests support existed on the part of those in charge of curriculum decisions and the allocation of space in the timetable to offer the subject with small numbers. In a study of the implementation of a revised Physical Education syllabus in Ireland, MacPhail and Halbert (2005) found this struggle for curriculum time experienced by new subjects is one of the main issues facing the implementation.

> *"When reflecting on the probable constraints to the introduction of revised or new syllabuses, a significant group of respondents referred*

to the already significant demands made by other subjects on the available curricular time" (MacPhail & Halbert, 2005, p. 296).

This was also evident in the fact that there was actually a year in which they were not able to get this necessary allocation for SEHS in the timetable due to constraints related to the size of the overall IB cohort at the school.

Justification was provided for introducing SEHS despite a small cohort. Staff expressed the view that, in the long term, offering more subject choices would attract more students which in turn would lead to economic benefits for the school. This concept of reward needing to outweighing cost has previously been identified an important factor in successful curriculum implementation (Fullan, 2007). The role of school support was also evident in the Rogan and Grayson (2003) model, with school ecology and management being suggested as an indicator of a school's *Capacity to Innovate.* This indicator acknowledged that in order for the curriculum change to have the most chance at successful implementation it is necessary to have the support of those leading the school. This emergence of this category from the data highlights the important role that school leadership has played during implementation. Evidence presented illustrates that support of the school in terms of timetabling, staffing and provision of resources is a factor which can affect the introduction of the SEHS.

Student Interest

Despite the evidence indicating a demand for the inclusion of SEHS, generating initial interest in the subject was identified as a challenge during implementation. Sufficient interest needed to be generated in order to attract enough students to offer the subject. This was achieved through the use of information evenings with students and parents, active promotion by teachers and targeting particular students who were viewed as ideal candidates for the subject. Furthermore, the promotion of the subject was said to have been initially made more difficult by the fact there was only limited information available relating to the nature and content of SEHS when the subject was first released. During the second year of the piloting

of SEHS the school was not actually able to offer the subject due to the inability to attract sufficient numbers, although the small overall size of the Diploma Programme cohort was given as a possible reason for this.

The emergence of this category suggesting there is a need to actively promote a subject in order to facilitate implementation highlighted an issue that was not encountered in the literature. A plausible reason for this exists in the fact that the curriculum change being introduced was one which involved an element of student choice. In the case of the introduction of SEHS into the diploma programme an important factor in successful implementation was convincing students to choose to study the subject. Based on the findings of this study it is suggested that the amount of active promotion of a new subject has an influence on its likelihood of success.

Standard Level

The inability of students to study SEHS as one of their Higher Level (HL) subjects was also mentioned as a challenge faced during implementation. Both staff and students expressed a level of dissatisfaction that it was not an option available to students[15]. It was apparent in the data that, given the choice, students who undertake SEHS would be likely take it as one of their three HL subjects. Furthermore the fact that it was limited to a Standard Level (SL) offering limited the number of students opting to study the subject. There was also a degree of student dissatisfaction relating to the amount of work involved considering it would only be counted as a SL qualification. While this is not likely to be an issue when SEHS gains full status and is released for widespread implementation, it does highlight an important point for consideration during the piloting of other new subjects in the future. Schools may need to be wary of being involved in piloting of subjects and it may actually be of benefit to wait until the subject obtains full status prior to attempting to introduce it. The emergence of this category from the data may also

[15] IB Diploma Programme subjects are only able to be offered as a Standard Level qualification during piloting

provide explanation for why, despite evidence of a demand for SEHS, the school experienced some difficulty in getting the numbers to offer the subject.

Teachers

Teachers played a significant role in the implementation of SEHS at the research site. Students were full of praise for the efforts of the teaching staff and viewed them as being a factor that had assisted in the school‘s ability to introduce SEHS. Support provided by teachers and the teachers‘ level of knowledge about the subject were mentioned as important factors that had assisting their learning. The high level of positive feeling expressed in relation to the role of the teacher in introducing this subject suggests that teachers were committed to the successful implementation of the subject. Teacher involvement in the curriculum steering committee for the piloting of SEHS was also viewed as having a positive effect in terms teachers‘ knowledge of the subject.

The importance of the role of teachers in implementation is a consistent finding in literature relating to factors influencing curriculum implementation. Fullan (2007) explained that implementation was more likely to be successful if teachers were committed to the change. This statement is supported by the findings of a case study of the implementation of Social, Personal and Health Education in Ireland. This study linked teaching to successful implementation with one of the key findings being;

> *“As with other curricular areas, the importance of the teaching was stressed as the essential ingredient for successful delivery of a quality programme” (Gabhainn, O'Higgins, & Barry, 2010, p. 463).*

The emergence of this category from the data provides further evidence that teaching staff responsible for delivering the content of new subjects play a vital role in the implementation process. In the hypothesised model suggested by Rogan and Grayson (2003) capacity to support implementation relies on a school possessing adequately qualified and motivated teachers. The findings of this study support this

theory and in the case of the implementation of SEHS it is important that those responsible for delivering the subject be enthusiastic and knowledgeable.

In summary, this section has provided a discussion of the results and the literature relating to the second research question: **From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Capacity to Innovate?** In this study, the construct *Capacity to Innovate* was informed by Rogan and Grayson's (2003) description. Specifically, —anattempt to understand and elaborate on the factors that are able to support, or hinder, the implementation of new ideas and practices in a system such as a school" (p. 1186). Based on the specific categories that emerged from this investigation of the introduction of SEHS at one Australian secondary school, five indicators for this construct are suggested. These indicators for *Capacity to Innovate* are:

- **Resources**- the availability of subject-specific resources, particularly a prescribed textbook posed a challenge
- **Facilities**- access to high quality facilities assisted teaching and learning
- **School Support-** support, including financial support, from school board and principal assisted is the ability to offer SEHS
- **Qualification-** limiting SEHS to a SL qualification affected numbers of students opting to study the subject
- **Commitment-** teachers were enthusiastic and knowledgeable about SEHS

As suggested by the name of the construct these indicators highlight important considerations for schools in terms of their capacity to support the implementation of SEHS. A sixth indicator also emerged from the finding relating to the importance of subject promotion in order to develop initial interest and is suggested to be unique to subjects such as SEHS where students are provided with a choice as to whether to study the subject or not. This indicator was labelled:

- **Subject Promotion**- SEHS needs to be actively promoted to attract students

While this was identified by participants as a factor that had affected implementation, it is suggested that, **Subject Promotion** does not necessarily fit neatly within any of the three constructs. This emergence of this indicator is discussed in more detail later in this chapter at the end of the *Advice for Other Schools* section.

OUTSIDE SUPPORT

Within the aim of investigating factors influencing implementation was a literature informed question specifically related to outside support that had been received during the implementation of SEHS at the research site. While it was evident that students were predominantly unaware of outside support received by the school, clear categories emerged from staff responses. Overall four specific categories emerged from the data; *Student Awareness; IBO Support; Limited Outside Support; and, Professional Communication.*

Student Awareness

Students involved in the piloting of SEHS at the research site were for the most part unaware of any assistance that had been provided to the school from outside agencies. There was an indication of knowledge that support of some sort would have been received from the IBO, but no awareness of what that support would have entailed was evident. When questioned specifically about outside support, students provided responses that suggested very little knowledge however in answers to other questions there was mention of their teacher‘s involvement in meetings at the IBO headquarters as well as communication with syllabus writers. The emergence of this category suggests that support for implementation occurred at a level above one in which students are involved.

IBO Support

The International Baccalaureate Organisation (IBO) provided support to the school during the implementation of the SEHS. Interview data used as evidence for this category related only to formal support received directly from the IBO[16]. This support was explained to have been received in the form of staff member involvement in the curriculum steering committee for SEHS and the provision of training workshops. No detail was provided as to the content of the training workshops and only vague details were supplied about support received though the participation on the committee. From the data gathered and initial meetings with school staff, it is known that these committee meetings predominantly involved discussions about the syllabus and suggestions for amendments rather than direct professional development of the teachers. This suggests that there was careful monitoring and review of the syllabus by the IBO throughout the pilot process. There was also evidence that support had been available to the school when clarification was needed with questions relating to the draft syllabus and its content. Support from outside of the IBO, however, appeared to be non-existent. The IB Coordinator alluded to a possible explanation for this in saying;

> *"they're [IBO] very protective about their courses anyway so you're not going to get a whole lot of support from anywhere other than there".*

Apart from those discussed there was no further evidence of any support, financial or otherwise, being provided by the IBO during the piloting of SEHS. Educational authorities, such as the IBO, play an important role in supporting implementation. In the findings of their study of the effectiveness of the implementation of a curriculum change in religious education Buchannan and Engebretson (2009) suggested that;

[16] Support from other IBO Schools was received however this was considered separate to the assistance from the official organization.

> *"In order to encourage an effective adoption of a top down curriculum change[17], this study suggests that the centralised authority directing a change needs to do more to assist those responsible for implementing the change in the school context" (Buchanan & Engebretson, 2009, p. 146).*

The provision of support from agencies outside the school setting is an essential consideration in any model of implementation. Rogan and Grayson (2003) identified outside support as one of the three interrelated constructs in their theoretical model of implementation. *Outside Support* was explained to relate to any assistance provided by organisations external to the school, in particular education authorities such as government departments of education. In the case of the introduction of SEHS, the educational authority responsible was the IBO so it is to be expected that a category would emerge identifying the IBO as the primary source of outside support. Consequently the findings of this study are consistent with theories that that propose support from educational authorities is an important factor during implementation of curriculum change.

Limited Outside Support

There was a consensus amongst staff at the research site that a limited amount of outside support was available to the school during the implementation of SEHS. Aside from the previously mentioned support that was provided by the IBO it was apparent that there is little other outside support on offer for schools looking to introduce the subject. A specific area of concern expressed by the teacher who has just begun teaching the course was the lack of professional development available for those responsible for delivering the content. This concern was expressed particularly in terms of preparing physical education teachers who may not have previously delivered the subject content in the depth that SEHS requires. The importance of preparing teachers to deliver subject content is consistent with previous research (Altrichter, 2005; Brady, 1995; Yueh, 2007). In particular, Yueh

[17] Top down curriculum change refers to those changes which are developed by government or educational authorities.

(2007) identified professional development as having an effect on successful introduction of new subjects concluding that;

> *"although teacher professional development cannot promise a new subject will emerge in schools, it definitely can help to consolidate the existing status of a school subject, especially when it requires new teaching content and/or method" (Yueh, 2007, p. 67).*

The need for effective professional development in facilitating successful implementation was highlighted by Rogan and Grayson (2003) who illustrated how in an ideal situation, ongoing support and training should be provided to teachers responsible for implementation of curriculum change. Similar findings were reported by Halbert and MacPhail (2010) who identified professional development as a key issue in successful implementation of Leaving Certificate Physical Education in Ireland.

In this study, limited support was not identified as an area which caused any major issues during implementation, however the evidence does highlight a need for schools to be aware that there is not a great deal of support available at this stage when assessing their capability to offer the subject. This may be particularly important if staff do not have a strong background theoretical knowledge of sports science.

Professional Communication

Communication with the other schools involved in the piloting of SEHS was identified as one of the primary sources of outside support for participants in the case study school. This communication was explained to involve regular contact with other teachers in the pilot program around the world in order to share teaching ideas, resources and suitable reference material. Meeting and developing relationships with other professionals teaching the course provided a mutual support group which was viewed to be a valuable resource for staff. Methods of communication utilised between staff at the pilot schools included; face to face meetings, email and the IBO's —Online Curriculum Centre" (OCC) a web based

forum site where staff can communicate and share resources. This communication was also identified as being useful in developing professional peer relationships. There was a consensus among staff this communication had been useful during the implementation of the SEHS at the research site. The usefulness of teacher communication and networking was also a finding of a curriculum implementation study conducted by Adams (2000).

In this study it was found that the development of professional networks amongst teachers involved in curriculum change had positive effects on motivation and capacity of the teachers to support the change. More specifically the development of teacher networks involving reflective dialogue about curriculum and instruction was found to assist in building capacity to innovate and the professional growth of teachers.

While the scale of this study is much smaller than that of Adams (2000), it has yielded similar results in that teachers at the research site found communication with teachers involved in the piloting of SEHS at other schools to have been of assistance. The development of learning communities was also confirmed by Rogan and Grayson (2003) in their explanation of how *Outside Support* might look in practice in a situation where implementation is highly successful. They proposed that implementation of curriculum is more likely to take place where there is a development of professional communities which share good practice. It is suggested from the findings of this study that communication through professional networking can assist teachers involved in the introductions of new subjects into the curriculum.

In summary, this section has provided a discussion of the results and the literature relating to the third research question: **From the perspective of participants at the research site, what categories are identified as contributing to the Rogan and Grayson (2003) model, specifically, the Outside Supports?** In this study the construct *Outside Support* was informed by descriptions by Rogan and

Grayson's (2003). That is, support from —organizations outside the school, including departments of education, that interact with a school in order to facilitate innovation" (p. 1191). Based on the specific categories for *Outside Support* that emerged from this investigation of the introduction of SEHS at one Australian secondary school, three indicators for this construct are suggested. These indicators for *Outside Support* are:

- **IBO support-** support was received from the IBO
- **Professional development-** limited professional development for teachers of SEHS was available
- **Professional communication-** sharing of ideas and resources amongst pilot schools assisted implementation

These indicators highlight important considerations in for schools in relation to support that is available to assist them in implementing SEHS in the future.

ADVICE FOR OTHER SCHOOLS

The second broad aim – after investigating the degree of alignment between the model and the participants' views of implementing change, was to gain insight into potential issues that may be faced by other schools looking to the introduce SEHS in the future. This was achieved by questioning participants on what advice, if any, they would provide to other schools looking to implement SEHS in the future based on their experiences during the pilot process. Specific categories that emerged had a degree of alignment to those that had been identified earlier as supporting or hindering factors. There were five categories that emerged from the data relating to this advice, namely: *Teaching staff; Facilities and Equipment; Teacher Preparedness; Teaching Resources; and, Subject Promotion.* A sixth category relating to a *Positive Attitude toward Implementation* was also identified.

Teaching Staff

There was a clear view regarding the importance of having qualified and capable staff to deliver SEHS emphasised in participant responses to this question. This

view specifically referred to the need for teachers to be knowledgeable in the subject area and capable of delivering the content confidently. Consensus was also evident regarding the need for teachers of SEHS to be enthusiastic and motivated and that teaching staff were fundamental to the success of the course. The more in-depth nature of the course content in comparison to similar local curriculum subjects was also identified as a reason for the need for well trained staff.

The emergence of this category is important for schools as it highlights that appropriate staffing is essential to the success of implementation. This category can be linked to the early findings of this study suggesting that the teachers were one of the factors that had assisted in the implementation. One suggestion for why having staff with a background in sport science was seen as important is that, at this point, there is no undergraduate qualification specific to the teaching of SEHS.

This finding is confirmed by a study of the implementation of AS/A level Critical Thinking in the United Kingdom, where Black (2009) proposed a link existed between the fact that no formal teaching training existed for an AS/A level Critical Thinking subject and relatively low achievement levels in the subject. While the findings reported in this study suggest a need for specifically qualified and knowledgeable teachers in order to effectively implement SEHS in other schools there is insufficient evidence to suggest this would have an adverse affect on student achievement. The finding highlights that, in introducing new subjects, teaching staff benefit from a strong background in the subject area. ‗Teacher factors' were also identified by Rogan and Grayson (2003) as a possible indicator within the construct *Capacity to Innovate*. Teacher factors were explained to incorporate teachers' background, training, level of confidence and their commitment to teaching. Consequently the findings of this study suggest that in order to support the introduction of SEHS a school requires a teacher or teachers who are motivated to teach the subject and are well-trained in the sports science area.

Facilities and Equipment

The need for schools to possess appropriate facilities and equipment for teaching and learning emerged as a category from the data. This suggests that schools wanting to offer SEHS should ensure they have the necessary facilities and equipment to deliver the subject to students. Facilities viewed as important included: a gym; or indoor sports venue; with access to exercise equipment such as weights and treadmills. Specialist measuring equipment such as blood pressure monitors and heart rate monitors, were also identified as necessary to conduct scientific experiments. The strength in this category is evident in the number of responses providing evidence for its emergence. There was a view expressed by a student that the SEHS subject could still be delivered without possessing such facilities, however, participants from all groups indicated that this may have a negative effect on student learning experiences.

Having access to the facilities necessary to deliver subject content is supported by literature relating to successful curriculum implementation (Fullan, 2007; MacPhail & Halbert, 2005; Rogan & Grayson, 2003). Rogan and Grayson (2003) emphasised the importance of this factor stating that —any theory of implementation will need to take the diversity of schools into account" (p. 1173). Schools therefore may need to consider whether or not they have the facilities and equipment necessary to effectively deliver the subject content when making decisions about introducing a subject like SEHS.

Teacher Preparedness

This category emerged out of comments indicating that schools and teachers should be aware that there is a significant amount of work involved in getting SEHS up and running and that teaching staff need to be motivated to assist in implementation. Advice offered suggested that those teaching SEHS will need to be well organised, prepared to develop their own resources, and if necessary, _brush up' on their knowledge of the subject content. The need for staff to be knowledgeable about the subject content is a strong theme in the data and further

highlights the need for schools to be aware of the importance of having qualified teachers to deliver SEHS. There are clear links between this category and the category advocating the need for teachers to be enthusiastic and motivated.

However the emergence of this category is also significant in that it highlights the possible need for teachers to engage in further learning in order to be able to deliver the content included in SEHS. It is suggested that the depth of content in this course goes beyond that which many current Physical Education teachers are trained to deliver and that is foreseeable that teachers will need to increase their own knowledge in order to teach SEHS.

Teaching Resources

The acquisition of subject specific resources, including a prescribed textbook, was one of the frequently suggested pieces of advice provided. While it was evident that no such text was available, there was a belief that this would help schools in the future. In light of the absence of a prescribed text, teaching staff suggested that schools should obtain a range of relevant textbooks for use alongside teacher developed resources. This carries the implication that teachers will need to prepare or locate resources for teaching the subject until SEHS specific resources become available. There was also an impact on student learning with evidence that difficulties were experienced due to the fact they often had to search around for information that, in other subjects, would be readily available in course textbooks. Overall it was apparent a belief existed that improved availability of SEHS specific resources would benefit students.

The idea of resources playing an important role in successful implementation is one that is well supported by the literature (Black, 2009; Chambliss & Calfee, 1998; Rogan & Grayson, 2003; Sun, 2007; Yueh, 2007). It is proposed that, in the context of the introduction of a new subject, the absence of subject specific resources is a challenge to implementation. Furthermore schools that are looking to introduce

SEHS in the future need to be aware that at present there are only limited resources available and teachers need to be willing to locate or create their own resources.

Subject Promotion

The importance of subject promotion to generate interest in SEHS was emphasised in responses to advice they would give other schools. Teaching staff recommended promotion in order to target and encourage students who they perceived as suitable candidates to take the course. Advertising the subject would also assist in attracting sufficient numbers to make it financially viable to offer the subject. Students also viewed promotion as important as a means of informing prospective students what is involved in the studying SEHS. A theme within this category also emerged suggesting that students interviewed were at first unsure of the academic merits of the subject and it was only after studying the course that they realised it was a –legitimate" science. It is foreseeable that this perception of the subject might deter students from choosing it and therefore, it is important that schools ensure the subject is promoted as one worth taking if implementation is to be successful. Teachers can play an important role in lifting the status of a subject though active promotion of its merits.

This is illustrated in Black's (2009) study of the introduction of AS/A Level Critical Thinking where it was found that barriers relating to poor perception of the value of the subject could be overcome by teachers acting as passionate advocates for its worth. The need for active promotion is unique to cases in which the subject is offered as a non-compulsory choice to students and is particularly important in terms of attracting enough students to make running the class viable for the school. The findings also suggest that active promotion is essential in instances where there is a possibility that the subject may not be viewed as a _legitimate subject'[18].

Positive Attitude toward Implementation

From the data it was apparent that there was a positive attitude amongst those involved in the piloting towards the implementation of SEHS. Those responsible for

[18] This is a well documented struggle for Physical Education subjects in the literature.

introducing and delivering the course since its inception encouraged other schools to offer the subject. Student involved in studying the subject made comments related to enjoyment in studying the course.

It was evident that experiences of the SEHS at the research site had been positive ones. The emergence of a category detailing positive feelings towards the subject provides further evidence that there is interest and consequently a demand for the introduction of SEHS. While this category does not provide an insight into factors that may affect implementation, it does highlight that those involved in the piloting of SEHS believe that it is a worthwhile addition to the IB Diploma Programme curriculum.

In summary, this section has provided a discussion of the results and the literature relating to the final research question: **Based on the experience of piloting of SEHS curriculum what advice would the participants at the research site provide to other schools contemplating enacting SEHS?** This question facilitated additional elements of change to emerge from the data that may not have otherwise been identified. Based on the specific categories from the *Advice for Other Schools,* one previously unidentified indicator emerged for the construct *Capacity to Innovate*. This indicator was:

- **Teachers**- teaching staff need to have appropriate qualifications to teach the subject

Other findings from this section serve to provide further strength for the identification of indicators: **Facilities, Resources, Commitment,** and **Subject Promotion.** As suggested earlier the indicator **Subject Promotion** doesn‘t fit neatly into any of the three existing constructs of the conceptual model. It is instead proposed that subject promotion is an additional overarching factor in the implementation process. The final finding discussed relating to the positive attitude that existed at the site

towards implementation provides support for the suggestion that SEHS is a worthwhile inclusion within the Diploma Programme.

SUMMARY

The discussions of the findings presented in this chapter provide an insight into the experiences of those involved in the piloting of SEHS at one secondary school in Australia. In answering the research questions, these findings have illuminated a range of issues that may be faced by other similar schools looking to introduce SEHS in the future. Indicators based on specific categories that emerged from the analysis of data have been suggested for each of the three constructs *Profile of Implementation, Capacity to Innovate* and *Outside Support*. As explained by Rogan and Grayson (2003) these indicators provide a means of measuring each of the constructs. A key outcome of the study is a proposed case-based framework informed by the multiple perspectives of the participants in the pilot school. The focus for the following chapter is the contribution of the framework for future research and implications for schools adopting the SEHS in the IB.

CHAPTER SIX

CONTRIBUTION AND CONCLUSIONS

Physical Education has, in recent years, enjoyed a period of improving subject status. Alongside the view of Physical Education as a valued academic pursuit has been the increased popularity of examinable forms of the subject offered in curriculum programs throughout the world. The piloting of Sports, Exercise and Health Science marks the first time an examinable form of the subject has been offered in the International Baccalaureate Diploma Programme and thus presented a unique research opportunity.

The purpose of this thesis was to investigate the implementation of SEHS through a case study of one Australian secondary school involved in the piloting of the subject. Specifically the research aimed to investigate participants understanding of the curriculum change being implemented, factors that affected successful implementation of the subject at school level and the level of outside support provided during implementation. Semi-structured interviews of staff and students involved in the piloting of SEHS at the research site were conducted in order to understand the implementation process from the perspective of those involved at the school level. Data from the interviews were analysed using a general inductive approach suggested by Thomas (2006). From the data analysis, the results highlighted a level of agreement and new information that the participants (coordinator, teachers, students present and past) provided regarding the three constructs of Rogan and Grayson‘s (2003) theory of implementation.

An additional question regarding advice to other schools contemplating the implementation of SEHS into their IB Curriculum provided new information on the process of change. As such, these findings move beyond this level of reporting to

now provide a case-based framework for future implementation of SEHS. The research is timely as it comes as the pilot program draws to an end and the subject becomes a mainstream offering within the Diploma Programme in September 2012.

This chapter is organised into three main sections. The first section provides a discussion of the case-based framework which was informed by the findings of the study. Discussion of the framework is presented in four subsections relating to the three constructs central to the framework, namely: *Profile of Implementation*; *Capacity to Innovate*; and *Outside Support* and the additional indictor included in the framework, *Subject Promotion*. Projected implications of these findings for future practice are suggested at the end of each of these sub-sections. The second section outlines the limitations of the study and the third and final section provides recommendations for future research resulting from the emergence of the case-based framework.

THE CASE-BASED FRAMEWORK

The results and findings of this study informs and enhances the conceptual framework of this study. As such, a case-based framework for implementation of SEHS (Figure 6.1) which was informed by Rogan and Grayson‘s (2003) model of curriculum implementation is presented. The framework also serves to address both the major research theme, mapping the findings to the conceptual framework as well as the final research question regarding the provision of advice to other schools looking to implement SEHS in the future. Specifically, the framework utilises the three constructs suggested by Rogan and Grayson (2003), namely: *Profile of Implementation*; *Capacity to Innovate;* and, *Outside Support*. In remaining consistent with the conceptual framework the constructs share three key characteristics; (i) they can be measured by means of indicators, (ii) they are broad enough to encompass a number of related factors and (iii) they are narrow enough to include one main idea (Rogan & Grayson, 2003, p. 1180). Within each of these constructs is a series of indicators for successful implementation that emerged from the results of a case study.

The indicators for the three constructs identified by Rogan and Grayson were specific to the widespread introduction of a whole school curriculum, *C2000* in South African schools and as such differ from those identified in this study. In their discussion Rogan and Grayson recognised the need for research to identify indicators in a variety of contexts and settings. For this reason the constructs: *Profile of Implementation; Capacity to Innovate*; and, *Outside Support*, were used to inform the research questions, however, the indicators in this study were created based on the specific categories that emerged out of the analysis of data. These constructs and indicators are synthesised to propose a case-based framework to inform the implementation of SEHS in other similar secondary schools. This framework is shown in Figure 6.1. An additional indicator *Subject Promotion* is included in the model and is discussed in detail in later in the chapter.

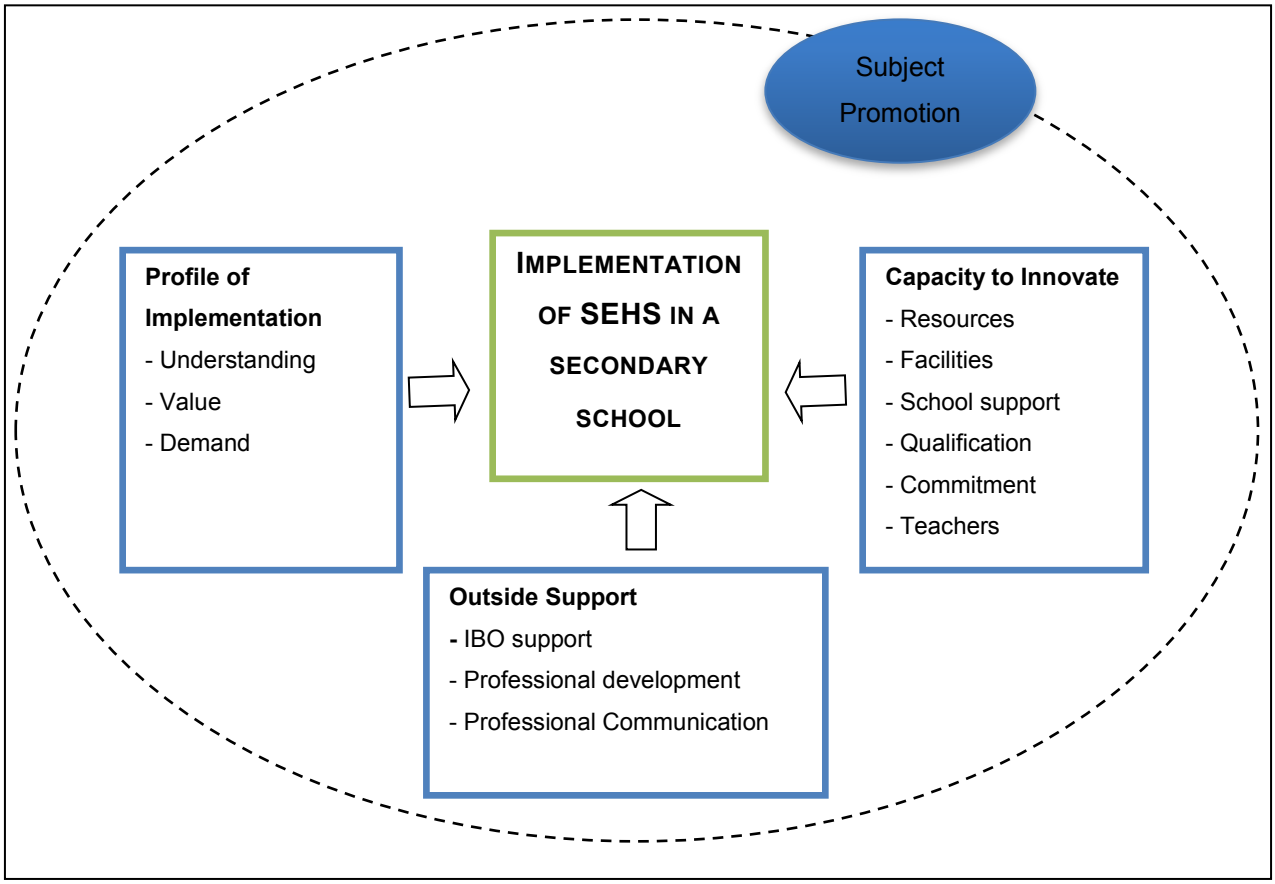

Figure 6.1. A case-based framework to inform implementation of SEHS

The framework features three constructs, namely: *Capacity to Innovate; Profile of Implementation;* and, *Outside Support* encapsulated by an additional indicator, *Subject Promotion.* Indicators listed within each of Rogan and Grayson's (2003) constructs are those that have emerged from the data. An additional indicator, *Subject Promotion*, encircling the implementation process as a whole is added to this model as the results of this study to demonstrate this is a new and important contribution from this investigation. The placement of *Subject Promotion* surrounding the other three constructs recognises the importance of advocacy for the subject throughout the implementation phase. A dotted line is employed for this construct to demonstrate that it is not an impervious indicator that stands alone, rather an overarching factor that is seen to increase the likelihood of success. Arrows from the constructs to the central purpose, implementation of SEHS, indicate the contribution of each to the implementation process.

As the methodology adopted for this case-study was unable to provide evidence for any inter-connectedness of Rogan and Grayson's (2003) constructs, Figure 6.1 depicts them as separate contributors to curriculum implementation. This depiction does not suggest however, that the constructs are not inter-related but rather that the findings from the research were unable to provide evidence of this kind. The central box highlights the limitation that the framework is based on the study of a single case. Indicators identified within each of the constructs are not intended to be a definitive list, rather an illumination of potential issues that may be faced by similar schools looking to introduce SEHS in the future. Further research in a range of diverse school environments is needed to test the applicability of the model and examine the possible existence of indicators not identified in this study.

The case-based framework illustrated in Figure 6.1 is intended for use as a guide for schools planning on introducing SEHS into their curriculum. It is, however, suggested that this model provides potential usefulness and applicability for a wider audience.

The framework therefore attempts to offer a model that summarises the experiences of participants in the case study school, and highlight those issues that had assisted or provided challenges to implementation. The following sub-sections provide a brief discussion of each of the constructs within the framework and possible implications for future implementation of SEHS in other schools.

Profile of Implementation

The construct *Profile of Implementation* is originally explained to be –in essence, an attempt to understand and express the extent to which the ideals of a set of curriculum proposals are being put into practice" (Rogan & Grayson, 2003, p. 1181). This construct acts to acknowledge and account for the multitude of ways in which a curriculum change may be put into action depending on the interpretation of those responsible for implementation. Profile of implementation allows curriculum planners at school level to examine their own situation and plan for implementation of the curriculum change.

In the context of this study, the implementation of SEHS reveals that this construct exists to allow schools to assess whether or not SEHS would be a suitable subject offering for their students. The indicators that emerged from the data, namely, *Understanding*, *Value* and *Demand* allow a school to evaluate their level of understanding of the change, the value in the subject's inclusion and whether a demand for SEHS exists.

The presence of shared understanding of the nature of the SEHS between syllabus writers, co-ordinators, teachers and students was evident in the data. The identification of *Understanding* as an indicator for successful implementation is supported by existing literature relating to curriculum implementation (Fullan, 2007) advocating the importance surrounding clarity of the change to be implemented. The indicator *Value* recognises the importance of SEHS being viewed as a subject that leads to tertiary/career pathways. Participant responses in this study suggested that SEHS was a subject which they viewed as providing pathways into

tertiary courses and/or career opportunities. Previous studies in implementation suggest that new subjects are more likely to be successful if they are viewed a worthwhile academic pursuit (Black, 2009; Tudball, 2005; Yueh, 2007).

The final indicator for this construct was *Demand*. This indicator is included to allow for an examination of the level of demand present for the inclusion of SEHS. Data in this study suggests that a demand existed at the research site with both staff and students viewing the subject as a positive inclusion in the diploma program. It is suggested that the likelihood of successful implementation is increased if a demand is present.

Implications of the findings for Profile of Implementation

The following recommendations are presented in the context of facilitating the successful introduction of SEHS based on the indicators identified for Profile of Implementation. Firstly, there needs to be a strong understanding of the nature of the subject. The results suggest that SEHS should be understood to be an interdisciplinary science subject that provides students with a broader science alternative to existing Group 4 Subject offered in the IB Diploma Programme. Secondly, it is important that the subject is viewed as one that provides pathways to tertiary studies or future careers. It was evident in responses from participants in this study that SEHS may be viewed as a subject that provides these pathways. Finally, a demand for the subject is important for successful implementation. Schools should assess the needs of their students and the interest of their staff to ensure that this demand exists.

Capacity to Innovate

The construct *Capacity to Innovate* is explained as —a attempt to understand and elaborate on the factors that are able to support, or hinder, the implementation of new ideas and practices in a system such as a school" (Rogan & Grayson, 2003, p. 1186). This construct recognises the diversity that exists in relation to the environment in which implementation occurs and how these factors can influence the success of implementation.

In the context of the introduction of SEHS, this construct allows schools to assess those factors that may affect their capacity to support the implementation of the subject. Indicators to emerge from the data for *Capacity to Innovate* were *Resources, Facilities, School support, Qualification, Commitment,* and *Teachers.*

The lack of subject specific resources available for SEHS was identified in the data as a factor that had provided a challenge during the piloting at the research site. The indicator *Resources* is included to recognise the importance of subject resources, particularly a prescribed textbook, in supporting implementation. In this study the provision of resources was affected by the fact that SEHS specific materials were not in existence. It is foreseeable that a schools ability to purchase resource materials may also affect its ability to support implementation.

The findings of the SEHS study align with findings from previous studies, highlighting the importance of availability of resources, and more specifically textbooks, (Chambliss & Calfee, 1998; Rogan & Grayson, 2003; Sun, 2007; Yueh, 2007). Taken together this provides confirmation for the inclusion of this indicator in the framework. The quality of *Facilities* available for teaching and learning was identified as a factor that may affect a school's ability to successfully implement SEHS. Participants in the study acknowledged the high quality of facilities available to them during the piloting of SEHS and recognised the important role facilities had played in assisting teaching and learning. The indicator facilities also accounts for equipment used in the delivery of the subject (e.g. HR monitors, blood pressure monitors, treadmills) This indicator is aligned with the importance of physical facilities in supporting implementation as demonstrated previously (Fullan, 2007; Halbert & MacPhail, 2010; MacPhail & Halbert, 2005; Rogan & Grayson, 2003) .

The indicator *School Support* recognises the role of school leadership (Principal, school board or council, school executive) in supporting the implementation of SEHS. The support of school leadership at the research site was reported as

having assisted in the implementation of SEHS. In particular, the provision of financial support and allowing the subject to initially run with small numbers were identified as having assisted implementation of the subject. The emergence of this indicator from the data is supported by results of a study by MacPhail and Halbert (2005) who found that support from school leadership in securing the necessary allocation of curriculum time was important for the success of a new subject.

The indicator *Qualification* relates to the qualification that students are able to obtain in undertaking the subject. In this study the fact the SEHS was limited to a Standard Level (SL) offering was viewed to have a negative effect on the numbers of students choosing to the course as one of their subjects. This situation is unique to the context of the study however it has been included as an indicator as the evidence suggests that the limiting of SEHS to SL may be a factor that could affect future implementation of the subject.

The indicator *Commitment* emerged from the view that subject teacher's level of motivation and enthusiasm can affect a school's capacity to implement SEHS. Responses from both staff and students recognised that there was a significant amount of work involved in getting the subject _up and running' and consequently emphasised the need for the school to have committed teachers in order to offer SEHS. The final indicator identified for the construct Capacity to Innovate was *Teachers.* This indicator has been included for schools to assess whether or not they have appropriately qualified to staff to support the introduction of SEHS. Data from this study provided evidence of a perception that the content of SEHS was more in-depth than some other examinable Physical Education subjects and that teachers may be required to _brush up' on their knowledge in order to teach the subject. Students commented on the benefit of having teachers who were knowledgeable about subject content.

Implications of the findings for Capacity to Innovate

Implications in this sub section are discussed in the context of facilitating the successful introduction of SEHS based on the indicators identified for Capacity to Innovate. In the absence of SEHS specific resources schools may need to investigate teaching and learning materials that are available for similar subjects. In terms of the future success of SEHS it is recommended that a subject specific text be developed. In terms of facilities, schools need to ensure they have appropriate facilities available to assist in the delivery of subject content. Based on the results of this study essential facilities and equipment would be those that allow for controlled scientific experiments to be conducted. An understanding of what is involved in the subject is important in assessing whether or not the school has facilities capable of supporting implementation.

Support from school leadership is integral to the success of the subject. Support required may include financial support in terms of teacher training, purchasing of equipment and/or resources and willingness to allocate the necessary curriculum time to offer the subject. Evidence from this study suggests that support in allowing the subject to initially run with small numbers may be required. The limiting of SEHS to a SL qualification poses a challenge to implementation. The findings of this study suggest that schools may experience difficulties in attracting student numbers if it remains a SL only subject.

In examining Capacity to Innovate schools need to assess whether they have teaching staff that can support the introduction of SEHS. The findings highlight the need for committed and enthusiastic teachers who are appropriately qualified in the field of sports science. Teachers should be aware that there is a significant amount of work involved in the getting the course up and running and that the content is more in depth than they may have taught in the past. The introduction of an undergraduate qualification related teaching SEHS may also be necessary in the future.

Outside Support

The construct *Outside Support* is originally explained to relate to support which is received from —organisations outside the school, including departments of education, that interact with a school in order to facilitate innovation" (Rogan & Grayson, 2003, p. 1191). This construct recognises the importance of external support during implementation. In the context of the framework relating the introduction of SEHS, this construct allows for the examination of the level of outside support provided to schools in implementing the subject. Indicators to emerge from the data for *Outside Support* were *IBO Support, Professional Development,* and *Professional Communication.*

The primary source of outside support in the implementation of SEHS was the IBO. As the educational authority responsible for overseeing all IB courses, the IBO is responsible for the provision of curriculum documents and supporting school in the delivery of course and the assessment of students. This study found this support was provided to the school and it had assisted during the piloting of SEHS.

Inclusion of indicator acknowledging the importance of the support of an educational authority is congruent with existing theories on implementation (Fullan, 2007; Rogan & Grayson, 2003). The indicator *IBO support* highlights the importance of schools utilising this support during implementation. The availability of *Professional Development* was identified as another indicator within this construct and recognises the need for professional development to assist teachers charged with delivering SEHS. It was evident in the data that at this stage there is very limited professional development available and presented a challenge for teaching staff at the research site. Similar findings advocating the importance of professional development in preparing teachers involved in curriculum implementation were evident in the literature (Rogan & Grayson, 2003; Yueh, 2007).

The final indicator for the construct *Outside Support* was *Professional Communication*. Communication with other schools involved in the piloting of the

subject was reported to have been a valuable source of outside support. This communication was explained to involve the sharing of resources and ideas through face-to-face meetings, email and the IBO's Online Curriculum Centre (OCC). The inclusion of this indicator acknowledges that the level of support available through professional networks can have an effect on implementation and is aligned with Adams (2000) statement that professional networking amongst teachers involved in curriculum change had positive effects on motivation and the capacity of teachers to support change.

Implications of the findings for Outside Supports

Implications in this sub section are discussed in the context of facilitating the successful introduction of SEHS based on the indicators identified for the construct Outside Support. The continued provision of support from the IBO is essential in the future implementation of SEHS. The need for educational authorities to provide ongoing support for courses they are responsible for is well documented in curriculum implementation literature and the introduction of SEHS is no exception. One possible area of improvement may exist around the provision of professional development for teachers of SEHS. By providing ongoing professional development for teachers of SEHS the IBO can ensure the manner in which syllabus content is delivered is consistent. Finally, schools are advised to encourage teachers of SEHS to utilise the OCC and other forms of communication to build professional networks with teachers of SEHS at other schools.

The Extra Indicator: Subject Promotion

An additional indicator, namely *Subject Promotion* encircling the three constructs is suggested. This indicator emerged from the finding that active promotion of the subject was needed in order to attract students to studying SEHS when it was first introduced at the research site. The need to attract students is unique to implementation situations such as the one in this study, where the new subject is one which students are provided with the option of studying. Subject promotion was identified as important at the research site in terms of ensuring sufficient student numbers to offer the subject. It was also reported that subject promotion at the

research site was used to target students whom staff felt would be suited to the subject. The inclusion of this additional indicator encircling the framework is a symbolic representation that promotion is essential to the implementation process as a whole.

CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

This study has suggested a case-based framework (Figure 6.1) for implementation of a new IB Diploma Programme subject, namely Sports, Exercise and Health Science. This framework extends the model of curriculum implementation suggested by Rogan and Grayson (2003) and applies it in a specific context. While this study is limited to a single case it does provide a major contribution to the understanding of the myriad of issues that may be faced by schools introducing SEHS in the future. It also provides a starting point for research into this new subject. Recommendations for future inquiry include:

- Replication of this study in schools in other geographical and cultural contexts to determine the validity of the indicators identified and possible identification of new indicators.
- Research into possible relationships between the constructs is suggested Application of the case-based framework to the introduction of other non-elective (compulsory) subjects to ascertain the alignment.
- Introduction of SEHS curriculum related content into undergraduate teacher preparation courses at tertiary level.
- Processes and implications of curriculum change could inform both pre-service teacher education courses and postgraduate leadership programs for in-service teachers.
- Application of the suggested case-based framework in school settings following the mainstream release of the subject in 2012.

- Research new schools implementing SEHS for the application of the framework to evaluate its context specific veracity.
- Teachers at the Pilot schools could pool their resources in order to provide a preliminary set of readings/ prescribed text overview and evaluate these for future schools planning on implementing the SEHS.

In conclusion, this investigation has the potential to inform future curriculum change and/or development in a range of schools, contribute to teacher preparation courses and in-service professional development, resource management and student learning. While data collected focused on participants‘ experiences of the piloting of SEHS, the framework may also be useful in informing future implementation of other subjects within existing curricula.

An important conclusion of this study is that the implementation of SEHS, in the main had, been successful at the research site. This conclusion is based primarily on the status of SEHS at the pilot school, which is projected to be offered when the piloting program comes to an end. Success was also gauged on the unanimously positive responses related to the need and value of the subject during the interviewing process.

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APPENDICIES

APPENDIX A: ETHICS APPROVAL

Ethics Office
Research Development & Integrity
Research Division
Armidale NSW 2351
Australia

Phone 02 6773 3449
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jo-ann.sozou@une.edu.au
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HUMAN RESEARCH ETHICS COMMITTEE

MEMORANDUM TO: Dr J Miller, Dr C Parker, Mrs A Freak & Mr B Doyle
School of Education

This is to advise you that the Human Research Ethics Committee has approved the following:

PROJECT TITLE: Introducing 'Sports, Exercise and health Sciences' into the International Baccalaureate Diploma Programme: A case study of an Australian pilot school.

APPROVAL No.: HE10/132

COMMENCEMENT DATE: 01/08/2010

APPROVAL VALID TO: 01/08/2011

COMMENTS: Nil. Conditions met in full.

The Human Research Ethics Committee may grant approval for up to a maximum of three years.
For approval periods greater than 12 months, researchers are required to submit an application for renewal at each twelve-month period. All researchers are required to submit a Final Report at the completion of their project. The Progress/Final Report Form is available at the following web address: http://www.une.edu.au/research-services/researchdevelopmentintegrity/ethics/human-ethics/hrecforms.php

The *NHMRC National Statement on Ethical Conduct in Research Involving Humans* requires that researchers must report immediately to the Human Research Ethics Committee anything that might affect ethical acceptance of the protocol. This includes adverse reactions of participants, proposed changes in the protocol, and any other unforeseen events that might affect the continued ethical acceptability of the project.

In issuing this approval number, it is required that all data and consent forms are stored in a secure location for a minimum period of five years. These documents may be required for compliance audit processes during that time. If the location at which data and documentation are retained is changed within that five year period, the Research Ethics Officer should be advised of the new location.

[redacted]

30/07/2010

Jo-Ann Sozou
Secretary

A09/2507

APPENDIX B: PLAIN LANGUAGE STATEMENT

INFORMATION SHEET for PARTICIPANTS

Title: Introducing 'Sports, Exercise and Health Science' into the International Baccalaureate Diploma Programme: A case study of an Australian pilot school

Researchers: Dr Judith Miller, Dr Clare Parker, Mrs Annette Freak, & Mr Benjamin Doyle
University of New England
School of Education
Armidale NSW 2351
jmiller7@une.edu.au or bdoyle21@une.edu.au

I wish to invite you to participate in my research on the above topic. The details of the study follow and I hope you will consider being involved. I, Benjamin Doyle, am conducting this research project as a postgraduate student for my Master of Education (honours) at the University of New England. My supervisors are Dr Judith Miller, Dr Claire Parker and Mrs Annette Freak of University of New England.

This research seeks to develop an understanding of the key issues relating to the introduction of Sports, Exercise and Health Science into the International Baccalaureate Diploma Programme in an Australian secondary school. This study will provide insight into the views of those who have been involved in the piloting of the SEHS subject, which in turn may identify any issues and or barriers to the widespread implementation of the subject.

In order to investigate this issue I will seek to interview participants who have been involved in the piloting of SEHS at an Australian secondary school. In particular these participants will have varying degrees of experience with SEHS in the Diploma Programme. The participants will be selected from both staff and students of the school as well as parents of students studying the SEHS course.

Following this email invitation to participate in the study, I will request that you provide me with a phone number that I may contact you in order to make a mutually agreed time to meet with you. Should you choose to participate an interview will take place in a mutually agreed venue in which you feel comfortable to respond freely to my interview questions. The interview will last for approximately 45 minutes and will consist of a series of open-ended questions to explore your views, understandings and experiences of the IB diploma program. Our conversation will be audio

recorded for the purpose of later transcription, however, all records of participant's identity will be removed to ensure anonymity. After analysis of the transcript a check for accuracy known as a member check will be sought.

Participation is entirely voluntary and I wish you to be aware of the purpose of the study being conducted. If for any reason you wish to withdraw at any time there will be no penalty of any type and your identity will be protected and as such, anonymity will be assured.

Audio recordings and transcriptions will be kept in a locked filing cabinet and/or as secure electronic files at the researcher's office in the School of Education at UNE. These will be kept for five (5) years following thesis submission, in line with standard academic research procedures, and then destroyed. It is anticipated that this investigation will be completed by the end of 2011. The results may also be presented at conferences or written up in journals without any identifying information. Copies of any of these papers will be made available upon request.

This project has been approved by the Human Research Ethics Committee of the University of New England (Approval No.HE10/132 Valid to 01/08/2011)

Should you choose to be involved, please find the Informed consent form, fill it in and return it to me by (DATE). Should you have any complaints concerning the manner in which this research is conducted, please contact the Research Ethics Officer at the following address:

Research Services
University of New England
Armidale, NSW 2351.
Telephone: (02) 6773 3449 Facsimile (02) 6773 3543
Email: ethics@une.edu.au

If you have any questions about the study you may contact the researcher's via the contact information at the top of the sheet. Thank you for considering this request and I look forward to further contact with you.
Regards

Mr Benjamin Doyle

APPENDIX C: INFORMED CONSENT FORM

Consent Form for Participants

Research Project:
Introducing 'Sports, Exercise and Health Science' into the International Baccalaureate Diploma Programme: A case study of an Australian pilot school

I, ……, have read the information contained in the *Information Sheet for Participants* and any questions I have asked have been answered to my satisfaction. Yes/No

I agree to participate in this activity, realising that I may withdraw at any time. Yes/No

I agree to the interview being audio recorded and transcribed. Yes/No

I agree that research data gathered for the study may be published using a pseudonym. Yes/No

…….. …….
Participant Date

…….. …….
Researcher Date

APPENDIX D: PLAIN LANGUAGE STATEMENT (<18)

INFORMATION SHEET for PARTICIPANTS (<18years)

Title: Introducing 'Sports, Exercise and Health Science' into the International Baccalaureate Diploma Programme: A case study of an Australian pilot school

Researchers: Dr Judith Miller, Dr Clare Parker, Mrs Annette Freak, & Mr Benjamin Doyle
University of New England
School of Education
Armidale NSW 2351
jmiller7@une.edu.au or bdoyle21@une.edu.au

I wish to invite you to participate in my research on the above topic. The purpose is to investigate the introduction of Sports, Exercise and Health Science (SEHS) at your school. I, Mr Benjamin Doyle, am conducting this research project as a postgraduate student for my Master of Education (honours) at the University of New England. My supervisors are Dr Judith Miller, Dr Claire Parker and Mrs Annette Freak of University of New England.

If your parents give you permission you may be interviewed on your experiences relating to the SEHS course. But it is your choice as to whether or not you decide to participate. Please sign the form attached if you would like to be involved in the study.

The results of this study are expected to be used to help with the introduction of SEHS at other schools and that your views will help to provide valuable information. This study is NOT a test in any way and there are no right or wrong answers.

Neither your teachers nor your parents nor anyone else at the school will read your answers. Your name is not attached to anything that you may say. Codes will be used instead of names.

The interview will take between 30-45 minutes and will be recorded using a digital audio recording device. You may choose to refuse to answer any questions and may also choose to withdraw from the study at any time if you decide that you do not want to participate. There is no foreseeable risk involved to participating in the study. You will only be asked to share your views and opinions.

Should you have any complaints concerning the manner in which this research is conducted, please contact the Research Ethics Officer at the following address:

Research Services
University of New England
Armidale, NSW 2351.

Telephone: (02) 6773 3449 Facsimile (02) 6773 3543
Email: ethics@une.edu.au

If you would like to be involved and share your experiences of SEHS, please complete the form below.

N.B. It is important that both you and your parent/guardian sign and date the form

If you have any questions about the study you may contact the researcher's via the contact information at the top of the sheet. Thank you for considering this request and I look forward to further contact with you.

Regards

Mr Benjamin Doyle

APPENDIX E: INFORMED CONSENT (<18)

Young Persons Consent Form for Participants (<18 years)

Research Project:
Introducing 'Sports, Exercise and Health Science' into the International Baccalaureate Diploma Programme: A case study of an Australian pilot school

I, ……, have read or have read to me in my first language, and I understand, the information contained in the *Information Sheet for Participants*

I have had any questions I have asked have been answered to my satisfaction. Yes/No

I freely agree participate in this activity, realising that I may withdraw at any time. Yes/No

I agree to the interview being audio recorded and transcribed. Yes/No

I agree that research data gathered for the study may be published but my identity will be protected. Yes/No

……..	…….
Participant	Date
……..	……..
Parent/Guardian	Date
……..	…….
Researcher	Date

APPENDIX F: EXAMPLE OF ANALYSIS

Personal file	Transcript data	Analytical file
Proceed to Q4 on interview guide. ***Direct question***	**BD:** OK. What, if any, have been the challenges in piloting Sports Exercise and Health Science at this school?	*Doesn't view there being too many challenges*
Participant is left to talk without interruption while notes are made on points to come back to	**SM-B:** The biggest challenges? There haven't been too many what I would call challenges. The... the main thing is to create enough interest in a pilot group to get the subject up and running, because until you can actually get a subject up and running, and to get the initial cohort through... and you get some reasonable results, and then you know word of mouth, actually then... that will attract more and more students. So if... if there has been a challenge it's mainly to get you know that first... that initial group through and get them talking about their experiences and how valuable the whole program has been to them. And get them talking to other students so we can maintain a program each year in Sports... in Sports Science. We... we haven't been totally successful in that regard. One year, and again, I suppose very much to on the size of the candidature... size of the cohort. This year we didn't have... we only had a very small cohort and there just wasn't enough science subjects, or there were too many science subjects to go around *{BD: yeah}* So...the first victim of course was *{BD: sports science}* Sports science, cause we only had about one... one or two so I suppose for economic reasons, and I suppose that's... that's a challenge, is to... is to convince the school council, the.. headmaster, that... that it... even if we've only got a very small number, that economically it might not be viable but the spin off, the benefits for the school in the long term are enormous. And I think, that's important because basically we've had the support of the school, the support of the council and the head, and we've been allowed to run sports science with very few numbers, simply to... well we try to provide as big an offering as we can of subjects and thereby attract more students to the IB program. So it's a... and we know that if you restrict the IB offering of subjects then you... you will cut out a large number of students. And that's what a lot of schools have found. I would normally see sport science, when it's, when it's fully implemented around the world, I would see that as one science subject which will be taken by most of the students as an HL. Whereas the other science subjects the HL level is probably only done by a third of the candidates, because the HL courses are significantly more difficult than the SL. And I think though ... I think when the... the...when it... when we finally get it, the HL version of... of Sports Science will be far more manageable, I think, by the average student.	*CHALLENGES: creating enough interest to have a pilot group* *Once the first group is up and running it becomes easier.* *ASSISTING: Having students that have done it promoting it to the next group* *There was a year where the was not enough interest to have a group due to overall IB cohort size* *CHALLENGE: When the group is small often first victim is a pilot type subject* *CHALLENGE: economic challenges relating to running small classes at first* *CHALLENGE: convince school council/principal of the long term benefits of offering more variety* *ASSISTING: School has been supportive* *CHALLENGE: If you restrict subject offerings it is harder to attract students to IBDP* *CHALLENGE: Pilot courses can only be studied to SL and this*

		is a drawback to many