An inquiry into the value of embedding English studies into the interdisciplinary program at the Australian Science and Mathematics School as a preparation for further studies and post-school work: A case study 2003 to 2010.

Alan David Laslett M.Ed., B.A., Dip.T.Sec.

College of Education, Psychology & Social Work

Flinders University

Dissertation for Doctor of Education (EdD)

Submitted June, 2018

ABSTRACT

This single-site case study employing narrative inquiry methodology was designed to investigate what past students valued and deemed to be effective from their studies of English embedded in an interdisciplinary curriculum delivered across Years 10 and 11 at The Australian Science and Mathematics School (ASMS). The school was a joint development between the South Australian Department of Education and Children's Services and Flinders University. It opened in 2003 with a mandate, as dictated in its Charter (Context Statement, 2011, Appendix 1), to foster excellence in science and mathematics education amongst students and local, national and international educators. The interdisciplinary curriculum embraced concepts, issues and applications central to the conventional sciences and studies generally associated with the arts and humanities, including English. These were integrated and delivered through eight Central Studies programs over a two year cycle. The assessment procedures and course content were designed to meet the requirements of the South Australian Certificate of Education (SACE) Stage 1. While a number of reviews and studies have produced reports that provide an evaluation of the success of the school as an educational institution and in meeting the goals of fostering excellence in mathematics and science education, no study has specifically examined the place and value of English, a mandatory subject for the completion of the SACE, as a component of the interdisciplinary approach.

Data were collected from hour-long guided interviews conducted with a sample of randomly selected past students who graduated from the school between the years 2003 and 2010, and from archival materials. The interview transcripts were subsequently re-shaped and presented as narratives. The initial analysis focussed on the collated recollections and evaluative comments of the graduates. Because of the nature of the interdisciplinary program, much of what

the graduates responded to related to the overall benefits they experienced from engaging in an interdisciplinary approach and consequently only in part to their specific experiences with English studies. While several graduates felt that there should have been a greater emphasis on literary analysis as a preparation for Stage 2 studies in English, and almost all commented on the limited focus on teaching the conventions of written English, overall they were positive about what was delivered as a preparation for Stage 2 studies and even more so about the preparation for post-school studies, work and life in general. In fact, the influence of the school in developing skills for living was highly regarded.

The dissertation also examines the changing nature of English both as a school subject and as an academic discipline and seeks to align the responses of the graduate students and the goals espoused by the ASMS to some contemporary trends in English education to inform the curriculum leadership team of the ASMS and encourage other sites to examine inventive possibilities.

CANDIDATE'S DECLARATION

I certify that this dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

ACKNOWLEDGEMENTS

CONTENTS

Photos, Tables and Diagrams

Glossary of Acronyms

ASC   Australian Marine Corporation

ASMS   Australian Science and Mathematics School

ATAR   Australian Tertiary Entrance Rank

CERI   Children's Environment Response Inventory

CS   Central Study

ILE   Innovative Learning Environment

LMS   Learning Management System

MAT   Mathematics

OECD   Organisation for Cooperation and Economic Development

SACE   South Australia Certificate of Education

SSABSA   Senior Secondary Assessment Board of South Australia

TER   Tertiary Entrance Ranking

CHAPTER 1: CONTEXT AND BACKGROUND INFORMATION

The following chapter provides an outline of the intention of the study and the factors that stimulated an interest in the case study site. As background, details of the specialist nature of the case study site (the Australian Science and Mathematics School), its learning goals, the diversity relating to the student clientele and the interdisciplinary nature of the curriculum are provided. The interdisciplinary Central Studies programs that form the curriculum units for study over a two year cycle are briefly outlined.The history behind the evolution of the school are described to provide a context for the reader. The final section of the chapter provides a summary of the structure of the paper.

1.1 The intention of the study

The study evolved as a result of working with staff and students at the Australian Science and Mathematics School (ASMS). While descriptive and evaluative research had been conducted in relation to the science, technology and mathematics aspects of the school curriculum, none had focussed on the integration of the arts and humanities, and specifically of English, within the interdisciplinary curriculum. The intention of this study was to investigate the value of embedding English into an interdisciplinary program as a preparation for further studies and post-school work. The use of a case study approach employing narrative inquiry methods was chosen as an appropriate tool to carry out such an investigation (See Chapter 3: Methodology). The study was restricted in its time frame from the inception of the school in 2003 to 2010 when changes to the South Australian Certificate of Education were implemented. The data collection comprised the reminiscences and perceptions and stories of randomly selected individuals who graduated between 2003 and 2010.

The key questions or issues explored are elaborated in Chapter 3: Methodology. However, in summary, they include:

- An exploration of the nature of interdisciplinarity as an approach to curriculum design and delivery
- An examination of the changing nature of English as a discipline and the place of English in an interdisciplinary approach at the ASMS
- The perceptions of a selection of graduate students from the ASMS as to how the interdisciplinary approach with particular reference to English prepared them for further study or post-school work
- An understanding of factors relating to the school environment or external systemic requirements, particularly in relation to the studies of English, that may have impacted on educational outcomes of the graduate students interviewed.

1.2 Factors that influenced the adoption of this topic for investigation

The first factor arose from a personal interest in the nature and teaching of English and the way English has responded to developing theoretical understandings, the demands of evolving socio-cultural needs and communication technologies as a component of language arts at the primary school level, as a discrete subject at the secondary level, and as an academic pursuit at the tertiary level.

The second factor related to a growing body of research, academic commentary and employer expectations suggesting that a more integrated approach to school curriculum would provide a more versatile pool of potential employees with the capacity to impact positively on the national economy and, hence, on affluence and quality of life (Dwyer, 1995). This has been confirmed by more recent contemporary evidence (Ryan, 2016; Tasmanian Government, 2016). Because of its commitment to an interdisciplinary approach, the ASMS seemed an appropriate site at which to conduct an investigation relating to such views. The reference in the title of this study to

'preparation for further study and work' is pertinent to the examination of these.

A third factor, noted while contracted as an interdisciplinary coordinator and manager of the international student program at the site, related to questions asked by many students and a number of staff at the ASMS regarding the relevance of incorporating the arts and humanities, including a study of English literature, into a curriculum at a school that has a clear mandate dedicated to the development of excellence in mathematics and the sciences. The nature and purpose of the ASMS is detailed in Section 1.3.

Finally, there was a strong expression of interest from the ASMS administration and leadership team to support research that would provide some base-line data and feedback from past students to be considered as part of their continuous curriculum review processes.

1.3 The nature of the site and its goals

The Australian Science and Mathematics School (ASMS) was architecturally designed to enable considerable flexibility in the delivery of an interdisciplinary curriculum at Years 10 and 11. The school is unique in that it is funded by the South Australian Government but shares facilities with Flinders University. Following is a description of the history of the school, its architecture, the clientele, and curriculum design.

1.3.1 History of the ASMS

The ASMS opened in 2003 with a goal to foster excellence in mathematics and science education and to ensure that more students were better trained and enticed into further study or careers that required or involved mathematical, technological or scientific understandings and expertise. Full details of the purpose of the school, its fundamental learning principles, organisational structures, mandates for professional development and links with Flinders University can be found in the ASMS Context Statement – 2011

(Appendix 1) which provides contextual details for prospective teachers, parents and other interested professionals. These are also reflected in the OECD/CERI: ILE Case Study Report (2011)[1] regarding innovative learning environments.

The school had a mandate to develop cutting edge pedagogy and promote this through the provision of training and development to a wide range of educationalists across local, interstate and international systems. (OECD/CERI, 2011, p.11.) The school caters for students from Years 10 to 12 but in the period of the research also provided specialist short term programs, e.g. for gifted and talented students and a range of summer school programs. All mainstream students are required to complete the requirements of the South Australian Certificate of Education (SACE) over Stages 1 and 2.

1.3.2 Facilities and structure

The school is a two-storey structure with nine learning commons planned around open-space principles. These commons have flexible furniture designed to be configured in a variety of ways appropriate to the learning goals and pedagogy. Complementing the commons are eight specialist studio spaces to facilitate health studies, media studies and production, and laboratory needs for the range of sciences, mathematics and aviation. A distance education facility, a conference room with interactive video and audio equipment, a large assembly space (referred to as the Void), a student kitchen/common room, and several private study spaces provide a versatile learning environment. All learning spaces are linked to online networks and the learning commons and studios have electronic screens and projectors for lesson presentations and access to the internet and electronically stored resources. Staff offices, with staff deliberately allocated spaces in cross-curriculum configurations, are open to the learning commons,

---

[1] OECD refers to the international Organisation for Economic Cooperation and Development. CERI refers to the Children's Environment Response Inventory. The report was a joint initiative focussing on innovative teaching and learning.

and staff (both teaching and ancillary) are readily accessible to students. Library facilities are integrated with the Flinders University Sturt Campus Library and the school is linked to the Flinders University email and search networks.

Some subjects were also taught in Flinders University specialist areas, e.g. the Earth Science laboratory on the main campus. Space is now also available on the Sturt Campus, e.g. for teaching aviation. For the period covered by this study, there was a strong emphasis on the use of mentors from Flinders University and beyond. Many of these were heavily involved in the University Studies[2] program current at the time but were also involved in other aspects of the school programme.
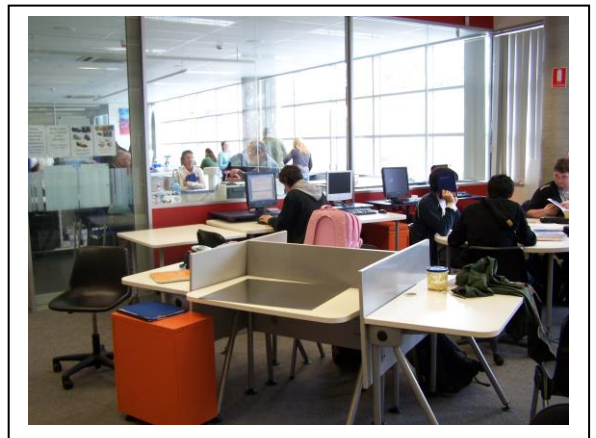
Photos 1 & 2:

Above left: The entrance to the ASMS complex showing the contemporary nature of the building.

Above right: A view of an open learning common in 2006 showing the seamless connection between a learning common and one of the science laboratories. In recent times the furnishings have been replaced to create an even more open and flexible learning environment.

---

[2]   The University Studies program was presented during one session a week and was designed to enable the exploration of topics, issues and current developments in science, mathematics and related technologies. The aim was to expand and enrich students' engagement with scientific and technological matters beyond the normal school curriculum. While sessions were largely planned and conducted by ASMS staff, academics and researchers from Flinders University were frequently involved and occasionally experts from other organisations also participated. See ASMS Context Statement – 2011 p.8 for a list of courses offered.
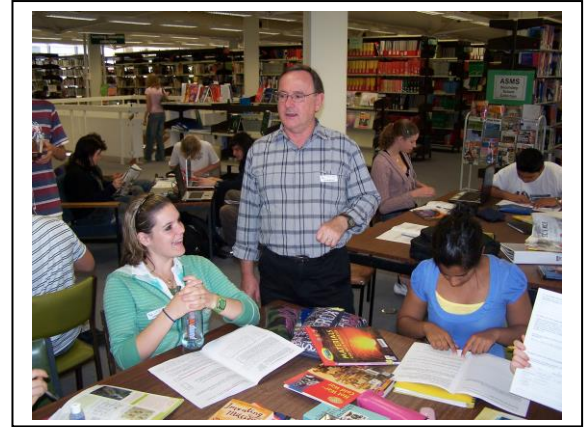
Photos 3 & 4:

Above left: Another view of an open learning common in 2006.

Above right: A teacher working with students in Sturt Campus Library in 2004, one of the facilities shared between the ASMS and Flinders University.

(Photos are the copyright of the ASMS but included with permission.)

1.3.3 Student clientele

Students at the ASMS come from a wide diversity of educational, social and economic backgrounds. The school is not zoned[3] and therefore attracts a wide spectrum of students from rural and metropolitan areas. Increasingly, there is a growing cohort of students from non-English speaking backgrounds. A key selection criterion, amongst a number, is that a student has a strongly expressed interest in mathematics and science. In addition to 'local' clientele, which in itself represents a diversity of cultural backgrounds, the student mix is further diversified by visiting international students who stay for short periods from a few weeks through to extended stays of more than a year. Population numbers from 2003 to 2010 are available in the ASMS Context Statement (2011) (Appendix 1.)

1.3.4 The Central Studies program

At Stage 1 of the SACE, the academic requirements are completed through eight interdisciplinary semester courses (Central Studies) which rotate over a two year cycle (ASMS Context Statement, 2009). Details of these programs (adapted for contemporary curriculum

---

[3] Most public secondary schools in South Australia have defined catchment boundaries or zones. Students residing within those boundaries would normally attend the secondary school within that zone.

needs) can also be found on the ASMS home page – http://www.asms.sa.edu.au

At Stage 2, the requirements are met through discrete subject studies as determined by the SACE Board. In recent years, the school has developed close academic ties with Flinders University, enabling students to complete courses cooperatively with the university and gain academic credits for future university studies. Some opportunity for this was also available during the period of this study.

Three separate Central Studies are presented each semester over a two year program (See Table 1). Studies in English are a part of each science-oriented Central Studies program but not part of Mathematics and Abstract Thinking which makes up the third Central Studies program (not represented in the following Table).

Semester	Central Study 1	Central Study 2
1	The Body in Question	A Technological World
2	Communication Systems	Sustainable Futures
3	Variety of Life	Towards Nanotechnology
4	Biotechnology	The Earth and the Cosmos

Table 1: The focus of each Central Study in which studies of English was a part (2003 – 2010)

The conventional components required for the completion of SACE Stage 1 English, i.e. text response, text production, and the power and function of language, were integrated into each Central Study, and the key science focus for each Central Study became the theme around which studies of English revolved. For example, in The Body in Question Central Study, for the text response component students selected a text relating to one of three different aspects—mental health, physiological health or immunology. The text production

component involved the analysis of scientific journal articles and the construction of an article for a science journal or magazine. The reflection on this task required a consideration of the power and function of language. Each Central Study was designed with a central Fertile Question in mind which the students were required to investigate or inquire into, usually in groups, as the semester progressed. The Fertile Question was an ASMS initiative designed to foster inquiry and to encourage an interdisciplinary approach to the examination of significant issues. In The Body in Question Central Study, for instance, the Fertile Question was, 'What is it to be human?' Towards the end of each semester, students were required to present their findings to the rest of the class, and sometimes publicly, as in the Towards Nanotechnology Fair (see Diagram 1, p.9). In the case of The Body in Question Central Study, the presentation of the response to the Fertile Question was assessed as the oral component for SACE Stage 1 English.

In Semester 1, students also engaged in a second Central Study entitled A Technological World. The central focus was to explore the various social impacts of developments in science and technology, particularly in terms of energy and materials. The Fertile Question for this topic was, 'What (aspect of) technology has had the most significant impact on society?' English-type tasks involved a film study of a documentary, presented as a text response, a text production (an imaginative or creative text stimulated by the content or theme of the documentary), and a multi-media response to the Fertile Question.

Space does not allow a detailed description of all Central Studies programs. However, following is a diagrammatic representation showing the interdisciplinary emphasis in the Towards Nanotechnology Central Study and the way in which various concepts and ideas relevant to the sciences, arts and humanities were interlinked (Diagram 1). The Fertile Question was, 'Is nanotechnology science fiction or science fact?' The 'nano product' refers to a public presentation of a product using nanotechnology and designed and

presented at a Nano Fair by teams of three students working across the disciplines.
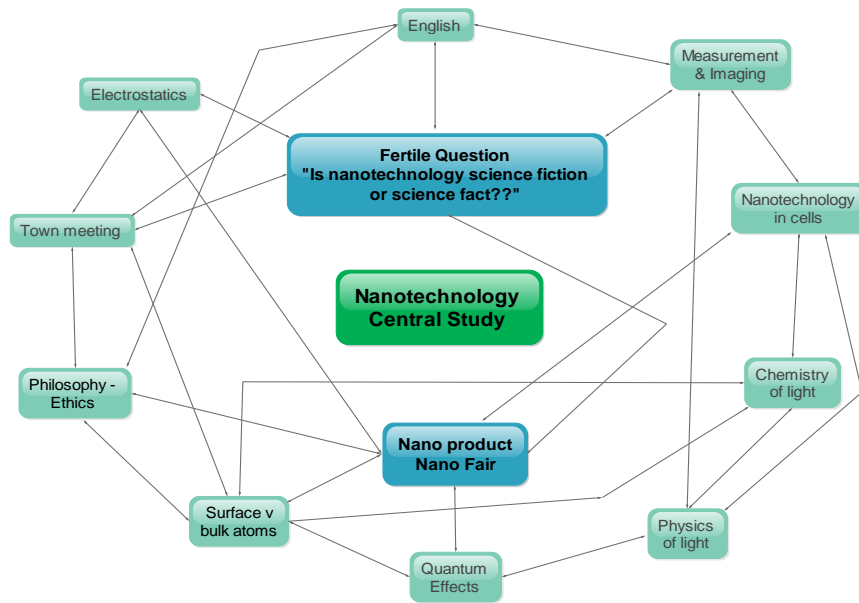
Diagram 1: Towards Nanotechnology Central Study interdisciplinary links (Adapted from Sara, 2004)

An examination of the Biotechnology Central Study is represented in a similar diagram (Diagram 2 below). The Fertile Question at the heart of that study was, 'Who benefits from biotechnology?' Another key focus was the development and publication of a biotechnology business website. To assist the students in exploring this question and developing their website, they engaged in a range of related studies that each implicated aspects of biotechnology. These included the study and construction of literary texts, engagement with a range of multi-modal texts, and the study of specific scientific phenomena. The more literary aspects embraced studies in English and film. Media studies, film production and the study of websites contributed insights through multi-modal representations. The more scientific concepts were addressed through a consideration of genetics, genetic engineering, fermentation processes, and studies of businesses that were manufacturing or retailing biotechnological products. The English components, film study, and film production texts also related to aspects of genetics. Diagram 2 illustrates the engagement of students in a comprehensive interdisciplinary endeavour but with a particular

focus on addressing the Fertile Question and completing the business website.
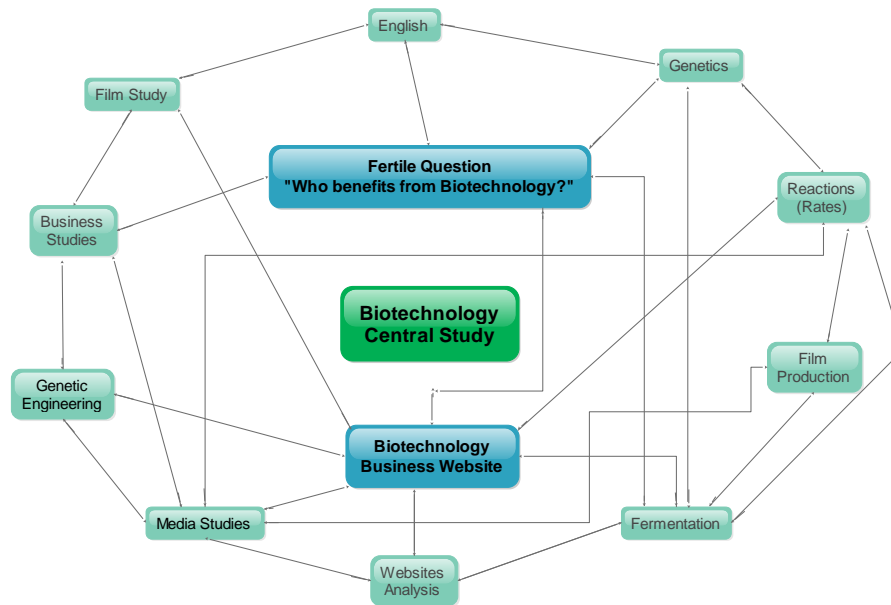
Diagram 2: Biotechnology Central Study Biotechnology interdisciplinary links (Adapted from Sara, 2004)

At the end of each semester, students had completed a range of SACE requirements as detailed by the Senior Secondary Assessment Board (SSABSA) and expected in a range of conventional disciplines, including English. Details of the course requirements including tasks, rubrics and interdisciplinary connections were available to students, teachers and parents electronically via the school Learning Management System (LMS).

1.4 Purpose and significance of the study

A key purpose of this study was to discover how influential the teaching of English as part of an interdisciplinary approach has been in: preparing graduate students for the communication challenges beyond school; the development of ways of thinking that may have contributed to their success academically and personally in post-school endeavours; and the acquisition of life skills in general. As mentioned earlier, central to this research are the perceptions of a selection of graduate students from the ASMS regarding what they

valued or recalled as significant from the embedding of English studies as a key component of an interdisciplinary approach in the Central Studies programs. The study is not an evaluation of effectiveness through contrasting the interdisciplinary approach with more conventional approaches in more traditional schools. Such a study would require systematic sampling across a range of schools to ensure comparability and equity in terms of socio-economic circumstances and regional variations and is beyond the scope of this investigation. Effectiveness in the context of this research is related to the perceptions of value as assessed by the research participants in relation to their own personal goals and achievements.

The construction of a picture of what was valued, based on the perceptions of the selected cohort of graduate students, will be useful for the ASMS curriculum leadership team and administration in informing the development of future directions in curriculum and alternative pedagogies which have already been put under pressure by the more prescriptive academic and standards performance requirements of the new SACE (hence, the limitation of this research from 2003 to 2010), the introduction of the National Curriculum, and possibly the changing nature of English as a discipline (See Chapter 6). From an academic point of view, a further value lies in the development of some baseline data and knowledge about an approach to teaching and learning, and its particular impact on the integrated teaching of English, that has little precedence at the senior secondary level in Australia. Because the study is based on what the graduate students recalled and asserted as valuable or significant, the outcomes reflect a genuine integrity since the data are derived through the narratives of the participants and their unique reflections rather than through a tight clinical framework. To provide consistency and an enabling framework for collation and analysis, however, the discussions with each graduate were guided by a number of core topics and questions. These are presented in Chapter 3: Methodology – Section 3.3.

1.5 Prior research within the school

Although there have been a number of reports and research papers relating to aspects of the ASMS program and its overall operation, the latest being the Innovative Learning Environments Case Study (OECD/CERI, 2011), no formalised research has been carried out externally to examine issues relating to the studies of English. However, there have been a number of Action Research projects and annual reviews in most of the Central Studies to evaluate the effectiveness of the courses, to learn from students about what worked and what could have been handled more effectively, and to determine the extent of achievement in terms of new understandings, knowledge or ways of learning and knowing (ASMS Archive Collection, n.d). While these reviews provided significant evaluative information to assist with planning for the following cycle, they related specifically to an immediate semester program rather than comprising comparative or cumulative sets of data over successive cycles. They also remained entirely within the confines of the school as internal evaluation documents.

In relation to English, some Action Research was completed examining written literacy achievement (Laslett, 2004; O'Reilly and Laslett, 2010) that involved the collection and analysis of samples of student work over several years. This contributed to the development of a range of literacy strategies to support literacy development in an interdisciplinary framework. The information gained was internally useful and predicated a further research project investigating literacy and science. The report on the latter has had limited external circulation and has been used in some overseas teacher training and development programs (Davis and O'Reilly, 2010). A more recent updated report entitled *Advancing Literacy within an Interdisciplinary Curriculum at the ASMS* is available on DVD produced by the South Australian Department for Education and Children's Services (Davis and O'Reilly, 2012).

1.6 Structure of the paper

The intention of the study, the incentives to pursue the study and background information relating to the site are detailed in Sections 1.1 to 1.5 of Chapter 1.

Chapter 2 recognises theoretical concepts that influenced the founders of the ASMS. A range of literature relating to interdisciplinarity as the model for curriculum delivery and the implications for teaching and learning is presented. The centrality of inquiry which is fundamental to the constructivist approach for effective learning is also highlighted. A brief overview of views of academics and educators about the changing nature of English as an important consideration for designers of an interdisciplinary curriculum.

Chapter 3 describes the narrative inquiry principles employed as tools for the case study.. The reasons for choosing a narrative approach, the processes associated with the selection of graduate participants are discussed in some detail. Of particular importance is the outline of the prepared questions and issues for discussion to facilitate the interviews.

Chapter 4 presents the constructed narratives encapsulating the reflections of the graduate participants.

Chapter 5 contains the synthesis of recollections, observations and commentaries of the graduates who participated in the study. This involves a number of layers of interpretation but the analysis is aligned with the goals, learning principles and pedagogies espoused by the school. The synthesis and analysis of their commentaries are organised around the questions and issues presented in Chapter 3. The chapter also attempts to present the aspects of the teaching and learning program that the participants valued at the ASMS, particularly in relation to the English components, and their assessments of what impacted positively on their preparation for post-school study, work and their lives. Concerns have also been acknowledged and elaborated.

The final chapter is a commentary on the place of English and curriculum design in an interdisciplinary program. Although the study was not designed to be an evaluation of success, the conclusions reflect the strong affirmations of the graduate voices. The chapter also acknowledges further associated areas for study and some possibilities that might be worthwhile explorations for other educational sites.

CHAPTER 2: FOUNDATIONAL THEORIES UNDERPINNING CURRICULUM DESIGN, TEACHING AND LEARNING AT THE ASMS

This chapter provides an overview of the literature relating to interdisciplinarity as the model for curriculum construction, the implications for teaching and learning and the learning principles that shape the curriculum design, delivery and expected learning outcomes. Particular attention is paid to constructivist processes which is an underpinning concept to learning at the ASMS. Finally, consideration is given to the changing nature of and challenges relating to English as an academic discipline and as a school subject.

2.1 The founding influences

The founders of the ASMS were visionary in recognising the impact of globalisation, were embracing of emerging information technologies, and were cognisant of the power of collaborative curriculum development and resourcing (Oliver and Davies, 2004). This resulted in the adoption of democratic and cooperative processes in curriculum construction and delivery that crossed conventional boundaries in research, knowledge creation, product development, sharing, distributive processes and marketing (Fischer, 2003; Larkin, 2001; Oliver and Davies, 2004). What evolved was a comprehensive interdisciplinarity that embraced a range of conventional arts and humanities subjects/disciplines including English, History, Geography, Philosophy, Media Studies, Politics and Psychology. This was particularly significant in a senior secondary school dedicated to fostering excellence in mathematics and the sciences. Section 2.1 refers to a number of accounts where interdisciplinary processes were established around limited curriculum links, e.g. English and History or Mathematics and Science. While interdisciplinarity at the ASMS was possible across Years 10 and 11 (SACE Stage 1), at Year 12 (SACE Stage 2), the final year of the South Australian Certificate of Education (SACE), disciplinary boundaries, curriculum frameworks and

assessment strategies were dictated by a central authority and required a reversion to teaching and assessing in more traditional and discrete subjects with specialised areas of knowledge, processes and metalanguages.

The significance of *interdisciplinary* as opposed to *integrated* or *cross-disciplinary* studies, and the distinction between what is defined as a discipline as opposed to an educational subject, is more than a subtle linguistic distinction (see Literature review, Section 2.1). For the present discussion, interdisciplinary may be taken to refer to the integrated study of key subjects and areas of learning that commonly form the curriculum offerings in secondary schooling. This may be at odds with how a 'discipline' is defined at a higher education level (Krishnan, 2009). While an interdisciplinary approach in contemporary senior secondary schooling, that is Years 10 to 12 at the ASMS, is relatively uncommon in Australia, interdisciplinarity was the predominant mode of educative thinking prior to the segmentation of knowledge into discrete disciplines in the 1880s (Lattuca, 2001; University of Toronto, 2004). However, there were antecedents to interdisciplinary approaches to education in the 1920s and 30s (Mathison & Freeman, 1998).

The work of Dr Yoram Harpaz was influential in shaping the concept of an interdisciplinary curriculum at the ASMS. Harpaz was critical of curriculum delivery in conventional schooling (Harpaz, 2003; Harpaz and Leftstein, 2000). He argued that traditional approaches through a compartmentalised curriculum frequently led to an elitist and often discriminatory view about knowledge acquisition. He summarised four images of traditional schooling: 'learning is listening; teaching is telling; knowledge is an object; and to be educated is to know valuable contents' (Harpaz, 2003, p.2). Caine and Caine (1991) referred to such curriculum delivery as the assembly line or factory model (p.13). As an alternative, Harpaz promoted inquiry processes through an interdisciplinary approach.

The foundation documents (ASMS, 2002; and other unpublished discussion papers—ASMS Archive collection) pertaining to the shaping of the ASMS curriculum and approaches to teaching and learning were predicated on the thinking of constructivist[4] educators and thinkers including Bruner (1966, 1986), Dweck (2000), Gardner (1983, 1993, 2000), Howard (1995), Piaget (1952), and Vygotsky (1962, 1978). Later ASMS documents (ASMS, 2009; ASMS, 2011a, 2011b, 2011c, 2011d; Annual Reports, 2004 to 2009; website Home Page; Oliver and Davies, 2004) present a dynamic and progressive set of principles relating to teaching and learning, the role of the teacher, and of schooling compared with more conventional models.

2.2 Interdisciplinarity: A literature review with links to ASMS practice

Mathison and Freeman (1998) reviewed more than one hundred and fifty papers relating to interdisciplinarity and demonstrated through references back to the early nineteen hundreds that interdisciplinarity, the melding of two or more disciplines into a connected study, is not a new phenomenon. Studies as early as 1937 by Oberholzer and later by Vars (1991) refer to interdisciplinary and integrated studies as significant directions in progressive education. Bloom (1958) introduced the term 'inquiry' as a foundational approach to teaching and learning in an integrated curriculum. Mathison and Freeman (1998) tracked historically the references to an interdisciplinary or integrated approach to curriculum delivery, but also cautioned that their overview was not based on empirical evidence about whether the approach works but rather with the justifications that were presented for proposing such an approach. They conceded that little work had been done to evaluate the value or success of an interdisciplinary approach to teaching and learning. While this literature review is focussed principally on education, interdisciplinarity is also applied in a

---

[4] A constructivist approach to teaching and learning is based on the view that learning is an active process involving each student in a dynamic construction of knowledge. New knowledge and understandings evolve from prior knowledge, active engagement, the process of inquiry and interactivity. See pp.35-36 for a more expansive discussion.

range of other fields and often quite specific areas of study (Thompson, n.d).

In contemporary education, movement towards an interdisciplinary curriculum escalated through the nineteen eighties and nineties (Dean, 1996; Fogarty, 1991; Jacobs, 1989, 1991). Lipson, Valencia, Wixson, and Peters (1993) linked interdisciplinarity or curriculum integration to Dewey's (1933) notion of meaningful learning. Fundamentally, interdisciplinarity was predicated on engagement with real world issues (Morse, 2008), critical or higher order thinking, problem-solving and inquiry (Burns and Sattes, 1995; Caine and Caine, 1991; Dwyer, 1995; Marzano, 1991). Morse (2008) summarised the benefits of an interdisciplinary approach, asserting that:

> Students benefit from cross-curricular education, as they are encouraged to critically assess the lessons learned in each discipline and to make connections across the traditional boundaries of formal subject matter (pp.297–298).

More recent studies strongly endorse the value of interdisciplinary teaching espoused by earlier proponents. Ghanbari (2015) emphasised the importance of inquiry-based experiential learning as a means to creating the possibilities for students to 'open up new ways of seeing, thinking and learning' (p.1). She asserted the importance of exploration that revolves around 'questioning and understanding concepts versus finding the answer to a given problem' (p.3). She acknowledged that there are many different approaches to exploring issues and ideas and that there are many different answers to problems. Eisner (2017) similarly focussed on inquiry as a significant approach to acquiring knowledge. Like many before him, he made strong assertions in relation to inquiry as a fundamental process for dealing with problem solving and events affecting the daily lives of people. At a societal level, he also argued that inquiry processes also have a significant function in managing diversity and effecting inclusivity. SERC-Carleton (2017) has developed 'taxonomy of significant learning' in response to the question, 'Why teach with an

interdisciplinary approach?' (p.1). This thesis contributes the additional dimension of interdisciplinary teaching as a tool to highlight moral or ethical considerations about events, issues or ideas, and hence, to Eisner's views about equity and justice.

Considerable discussion at a systemic level has revolved around various models of integrated practice. Comprehensive definitions relating to interdisciplinarity in curriculum design and delivery are sometimes more implied than stated. A Department of Education and Children's Services Curriculum Digest Paper (DECS, 1996) drew on a New South Wales Board of Studies 2005 paper to define curriculum integration as 'the purposeful planning by teachers of strategies and learning experiences to facilitate and enhance learning across key learning areas' (p.1). The paper elaborated four distinct models, as proposed by Fogarty (1991): a multi-disciplinary or webbed model, an intra-disciplinary model, an inter-disciplinary model, and a trans-disciplinary model. The interdisciplinary model was defined as one that 'identifies common elements from within and across areas of study, cross-curricula competencies, values, attitudes and ethics' (DECS, 1996, p.3).

Mathison and Freeman (1998) likewise differentiated models for cross-disciplinary instruction—interdisciplinary, integrated and integrative (pp.5–9). They suggested all three models could be represented along a continuum seeking to develop learning across a range of disciplines. However, in presenting the characteristics of an interdisciplinary model they distinguished between those relating to mathematics and science and those relating to the social sciences and the language arts. For each set, they described particular characteristics relating to the discipline represented, historical influences, the role of the teacher, the goals for students, the nature of knowledge, integrative threads, and they referenced various educational proponents. For two of three representations of an interdisciplinary approach, the role of the teacher is described as 'authoritarian.' This is not the concept prevalent at the ASMS. In the third collation relating to science, technology and

society, the role of the teacher is listed as that of a 'visionary guide' (pp.8–9), and for an integrative approach as a mediator/negotiator (p.9). While Mathison and Freeman (1998) made no specific mention of constructivist approaches, apart from developing inquiry skills and decision making, they summarised the purpose and function of an interdisciplinary approach:

> An *interdisciplinary approach* always consciously combines two or more disciplines and keeps them distinct and in focus. It has clear objectives that includes both critical thinking skills and in-depth content, and is typically teacher directed but may welcome student input (p.6).

This is very similar to Jacobs' (1989, 2004) definition of interdisciplinarity as 'a knowledge view and curriculum approach that consciously applies methodology and language from more than one discipline to examine a central theme, topic, issue problem or work (Jacobs, 2004, p.2). Loepp (1999, pp.22–24) also attempted to develop 'models of curriculum integration' but initially had to debate the subtle difference between the notions of integrated versus interdisciplinary curriculum—terms often used interchangeably by academics when discussing cross-disciplinary approaches to education. Loepp suggested three main models: an administrative block of time with a team of teachers to pursue negotiated interests; a problem-based approach; and a theme-based model. While Loepp adopted Jacobs' definition of interdisciplinarity (Jacobs,1998 p.8), she agreed with Kain (1993) that interdisciplinary studies maintain a strong disciplinary base, and suggested that studies that purport to be interdisciplinary often are essentially a 'repackaging' or 'enhancement' (Kain, 1993 p.317) of knowledge generally regarded to be significant to a mono-disciplinary approach.

An interdisciplinary approach, however, is not without its critics or cautions (Brophy and Alleman, 1991; Strubbe, 1990; Willis, 1994). Bernstein (1971) argued that curriculum integration would have the likely effect of threatening social order and the secure frameworks that

enable access to specific areas of knowledge and understanding. Brophy and Alleman (1991) asserted that curriculum integration was 'not always a good idea' (p.66). The concerns were aptly summarised by Knapp (1996):

> Some believe that less content is learned and, therefore, subject matter is lost. Others do not want one discipline to overshadow others. Another concern is that thematic units fail to focus on powerful ideas for the subject and, therefore, students may not appreciate the intricacies of the subject (p.15).

The implication here is that genuine learning and deep understanding through an interdisciplinary approach only comes when there is already a deep-rooted understanding of the principles within the separate disciplines (Gardner, 1993). The idea of teaching for understanding was further explored in *The Teaching for Understanding Project* (Gardner, Perkins and Perrone, 2005). They referred to the expression of in-depth learning as 'performances of understanding' (Gardner, Perkins and Perrone, 2005 p.1; Perkins, 1993 p.6). Understanding is defined as the moment when knowledge can be applied in a variety of new situations or new ways. While some are cautious, others recognise that at post-school levels much of the 'important work in their fields occurs at the interface between disciplines' (University of Toronto, 2004 p.2). Indeed, some contemporary academics see that crossing boundaries between disciplines and the assimilation of knowledge across disciplines may be essential for survival and the enhancement of global citizenship (Hargreaves, Earl, Moore and Manning, 2001; Mathison and Freeman, 1998). This is particularly so in a world in which there is rapidly changing information technology, demands for more services and products to facilitate lifestyle expectations, threats to the world environment, and where there are new discoveries in science and technology (especially those that relate to biotechnology and nanotechnology). Certainly, the relationship between learning and the evolution of responsible global citizenship and positive socio-cultural relationships is consistent with the views of Vygotsky (1978), who

asserted that '…learning is a necessary and universal aspect of the process of developing culturally organized, specifically human, psychological functions' (p.34).

The debate about the respective values of a mono-disciplinary approach as opposed to an interdisciplinary approach is evidenced in the literature (Bernstein, 1971; Brophy and Alleman, 1991; Strubbe, 1990; Willis, 1994). Some educators like Grossman and Stodolsky (1995) suggested that the focus on 'distinct subject cultures' (p.5) might inhibit progressive school change. Others (Bernstein, 1971; Langer, Confer and Sawyer, 1993) favoured the single discipline approach. Some of the concerns related to a fear that students might miss out on foundational disciplinary knowledge. Mathison and Freeman (1998) acknowledged the concerns of some educationalists who feared the diminution or dilution of fundamental concepts important to single disciplinary studies in an interdisciplinary curriculum. Gardner and Boix-Mansilla (1994 pp.17–18) asserted that deep learning through an interdisciplinary approach could only occur through the primary engagement with a single discipline. In their justification they separated the term 'discipline' from the conventional academic subject. They purported, as did Canning (2004), that disciplines represent ways of exploring issues, whereas subjects are constructs through which to manage 'schedules and catalogues' (p.16). They justified the focus on disciplinary study on the grounds that students benefit from the modelling and expert knowledge of teachers who 'embody' the practices of a discipline; that students have the opportunity to acquire the collective wisdom, knowledge and understandings that have evolved through disciplinary study over time; and that only through intense focus and the expending of time can students access the history, theories, concepts and methodological approaches that experts devoted to a discipline have acquired and developed over time. Indeed, Gardner and Boix-Mansilla (1994) dismissed the advocacy of interdisciplinary work as a fashionable trend. They asserted:

> Even as it is now fashionable to critique the disciplines, it is trendy to advocate "interdisciplinary" work. At its best, interdisciplinary work is impressive. However, such work can only be legitimately attempted if one has already mastered at least portions of the specific disciplines (p.17).

In spite of acknowledging that 'all disciplinary boundaries are tentative' (p.17), Gardner and Boix-Mansilla (1994) maintained a strong thesis in favour of mono-disciplinary teaching as the 'most useful way of illuminating…generative issues' (p.17). They further supported this view by elaborating the different assessment criteria associated with problem-solving, analysis, representation of knowledge, and the 'intelligences' associated with specific disciplines—assessment approaches that are certainly at odds with those adopted by the ASMS.

While proponents of mono-disciplinary approaches have expressed the fear that expertise within a single discipline might be lost if subsumed in an interdisciplinary approach, a study by Langer, Confer, and Sawyer (1993) indicated that within a single disciplinary approach 'teachers do not seem to have a 'codified' language to talk about ways of knowing, even when they want to' (p.2). They observed that although each of the eight teachers tracked used a similar educational nomenclature in relation to their expectations, there were different interpretations and weightings as to what the terminology meant. For example, all wanted their students to make connections, question, predict, analyse, interpret, provide evidence and reason, but the researchers discovered that such activities or processes were interpreted differently within discipline-specific areas (p.5). Agee (2000) conducted a multi-site interpretive case study examining the pedagogical approaches of individual teachers. The report relating to the study of two high school English teachers, though not conducted in an interdisciplinary setting, highlighted significant differences even though the curriculum focus was 'literature instruction'. These studies suggest that the configuration of space, the influence of fellow teachers and students, and the degree to which students might be

encouraged to read critically, contest texts and represent their views might affect mono-disciplinary and interdisciplinary practices alike. It is apparent that such differences in interpretation and practice are less likely to cause confusion for students in an interdisciplinary approach such as at the ASMS where teachers work collaboratively to develop integrated curriculum or thematic units across the curriculum.

The notion of working within a discipline, and understanding what a discipline is, is relevant within the context of the ASMS in that, during the period represented in this research, students still needed to be assessed and certificated at the Stage 1 level according to the subject requirements of the Senior Secondary Assessment Board of South Australia (SSABSA). The implication of this as compromising to some degree the success of a broadly-based interdisciplinary program was recognised by Hargreaves et. al. (2001). They concluded that:

> Incompatible with any such approach is excessive centralized curriculum control that overloads teachers with detailed curriculum content, nails them down to a complex apparatus of subject-based standards, or assesses the fruits of their labours by the exclusive (in both senses) use of subject-based tests and examinations (p.112).

Grossman and Stodolsky (1995) 'describe features of disciplines and school subjects that differentiate between subject matters and give rise to distinct subject subcultures…characterized by differing beliefs, norms, and practices…' (p.5). These subject divisions have defined conventional schooling for more than a century. Canning (2004 p.1) distinguished between subjects and disciplines, referring to a subject as a 'knowledge base' and a discipline as a 'tribe' or 'culture', a key distinction he adopted from Becher (1989). One justification provided by Canning for interdisciplinary studies was based around the socio-cultural view that 'life is interdisciplinary' (p.1). However, while endorsing the strengths of interdisciplinarity, Canning asserted that 'the concept of interdisciplinary teaching depends to a large extent upon disciplinarity itself' (p.2). At the ASMS, the importance of

recognising disciplinary differences as part of the interdisciplinary approach is determined to some degree by the nature of the Stage 2 subject choices that lead to SACE completion and an Australian Tertiary Admission Rank (ATAR) score. At the pre-Stage 2 level, tasks were therefore carefully designed to ensure that various components could contribute to students being given accreditation through a criterion-based assessment against the specific subject requirements demanded for the SACE.

Gardner and Boix-Mansilla (1994) were both participants in the Interdisciplinary Studies Project at Project Zero conducted at the Harvard Graduate School of Education. Interestingly, a project colleague, Svetlana Nikitina (2002), presented a significantly different point of view from theirs. However, she concurred with the earlier Gardner and Boix-Mansilla work relating to the nature of 'inquiry' or the investigation of problems in diverse ways to generate possible answers to important issues. As with Mathison and Freeman (1998) before her, and drawing on the work of others (Klein, 1996; Klein and Doty, 1994; Kockelmans, 1979; Lattuca, 2001; Newell, 1998), Nikitina elaborated different levels of interdisciplinarity and then refined four characteristics of interdisciplinarity: conceptual bridging, comprehensive, problem-solving and interpretive (p.3). The key elements or strategies central to the construction and execution of a curriculum evolve as 'contextualizing, conceptualizing and problem-centering' (Nikitina, 2002, pp.3–4). Each of these is defined and integrated to determine a curriculum that generates the tools for responsible global citizenship or social understanding, connecting knowledge to address real-life issues or problems, engaging in epistemological discussions, and developing individual empowerment through self-understanding. In Nikitina's study, one of the participating teachers alluded to the link between motivation and curiosity, a persistent interest in seeking knowledge, and the development of students' knowledge of themselves as 'independent knowers' (p.14). This is entirely consistent with the espoused goals of the ASMS.

In the model outlined by Nikitina (2002), the key strategy of 'contextualizing' (pp.3–4) refers to 'a method of embedding disciplinary material in the fabric of the time, culture, and personal experience' (p.6). She elaborated on this with reference to the disciplines embraced by the humanities, for example, Philosophy, History, Literature Studies, and the fact that each of these relies on different tools, contexts and ways of assimilating knowledge. In an interdisciplinary approach to curriculum, these disciplinary differences become valuable in providing alternative approaches to examining issues and developing different possible solutions to problems. Conceptualizing (Nikitina, 2002, pp.3–4) is defined as 'identifying core concepts that are central to two or more disciplines (e.g. change, linearity) and establishing a rigorous quantifiable connection among them' (Nikitina, 2002, p.6). In Nikitina's paper, the exemplification relating to the notion of conceptualizing is presented entirely in relation to mathematical and scientific studies, hence the reference to linearity and change in her definition. She differentiated the processes of knowledge acquisition and analysis from those relating to the humanities, insisting that conceptualizing in relation to scientific or mathematical investigation demands '…a stringent standard of verification, replication and mathematical expression' (Nikitina, 2002, p.18). In the ASMS model, it is doubtful that the elements of *contextualizing* and *conceptualizing* are mutually exclusive as represented in Nikitina's third strategy which she referred to as *problem-centering* (Nikitina, 2002, pp.3–4), a component of which is *problem-solving*. This strategy 'involves enlisting the knowledge and modes of thinking in several disciplines (Biology, Chemistry, Political Science, Economics) to address messy real-life problems (such as water pollution, genetic engineering, or Africa) that take more than one discipline to solve' (Nikitina, 2002, p.6). This approach is central to the development of the Central Studies programs at the ASMS which evolve around a central scientific theme and a significant Fertile Question.

Jacobs (1998, 2004), Loepp (1999) and Mathison and Freeman (1998) all acknowledged that inquiry is primary or central to any inter-, cross-, or trans-disciplinary model. Mathison and Freeman (1998) concluded that '…interdisciplinary…approaches are not simply attempts to combine two or more knowledge bases, but also to do so in ways that are more inquiry-oriented, hands-on, and connected to the real world' (p.6). Loepp (1999) based some of her support for an interdisciplinary approach on the presumption 'that most real world problems are multi-disciplinary in nature and the current curriculum is unable to engage students in real world situations, to solve real world problems' (p.22). In this context, establishing problem-solving challenges across the disciplines through inquiry not only promotes problem-solving strategies but engages students in the acquisition of new knowledge and understandings that are relevant or meaningful. According to Barab and Landa (1997) such an approach has a positive effect on student motivation, access to information and the ability to discover new connections and engage with new ideas. A practical example of this as an effective learning strategy is illustrated in a middle school study by a South Australian science teacher (Down, 2006). In establishing the foundational constructivist learning theory for his paper, he said, 'Students identify their focus of inquiry and are then mentored through the process of researching the appropriate essential learning, key ideas, new skills and knowledge acquisition anticipated and eventually obtained' (p.10). Down provided a variety of exemplary approaches for classroom practice. These were strongly illustrative of Loepp's (1999) view that inquiry, problem-solving, and the construction of knowledge through constructivist processes guided by a central focus and significant questions are fundamental to successful interdisciplinary approaches. Similarly, Jacobs (2004) concluded that establishing an interdisciplinary approach around 'essential questions' would do more than merely show students the connections but 'will illuminate them' (p.2). Such views are an endorsement of the centrality of the Fertile Question, a focal point in each Central Study at the ASMS.

The powerful place of dialogue in engaging students with problem-solving, making connections between concepts across the disciplines (or even within them), and evolving skills in critical thinking is evidenced through the work of Bakhtin (1981), Dewey (1933), and Vygotsky (1978). Even in earlier classical times, the Socratic Method (Phillips, 2002, p.18) relied on a healthy question-answer-question technique to promote learning through challenging ideas and responses to propositions, the examination of assumptions and the critical and reflective consideration of ideas and possibilities. Dewey (1933) promoted the need to connect learning with the everyday experiences of students. Maslow (1943, 1965, 1970), amongst others, inspired the importance of creativity and the value of constructing imaginary situations through which to generate new understandings and solutions to problems.

In a focus on multicultural education, Cliff and Miller (1997) asserted that interactive discussion between students and a teacher develops a 'dialogical context in which students develop dialogical reasoning' (p.1). Further, they insisted that for this to happen there needs to be a change in the way the curriculum is designed and delivered and how the dialogue in the classroom is generated. While their ethnographic study focussed on the interrelationships between History and Literature Studies, the implications are even more significant for classes that integrate content and concepts from more than two disciplines, as at the ASMS. The change(s) in how the classroom dialogue can occur is referred to by Cliff and Miller as 'opening the floor' (p.2). The significance of this concept is that students are invested with more control over their learning and, as a community of learners, can engage more productively in the pursuit of knowledge and understanding that has greater relevance to their lives, intellectually, socially and economically. Cliff and Miller (1997) summarised the outcome succinctly. They concluded:

> To create a community of learners actively engaged in dialogue
> with texts and with each other, the teachers, with the students,

opened the floor, providing a safe place to share their opinions together (p.2).

'Opening the floor' (Cliff and Miller, 1997) is certainly an underlying intention in the development and delivery of the curriculum at the ASMS as outlined in the learning approaches presented in the Context Statement(s) (see Appendix 1).

There are many studies that strongly affirm that the melding of learning, engagement and attitude using integrated or interdisciplinary processes is more effective. Lake (2001) commented on the synergistic nature of the teaching and learning where interdisciplinarity is applied. Some attempts at cross-disciplinary approaches have been evidenced in College programs in the United States but the incidence of working across the disciplines is more prevalent in the elementary, primary or middle school domains. The range of studies is represented by Lake (2001), Lawton (1994), Ritter (1999), Schubert (1993), Schubert and Melnick (1997), Walker (1996). Yorks and Follo (1993) related a case study that compared engagement rates of students in conventional and thematic teaching approaches, where a thematic approach embraced an holistic curriculum rather than 'a series of separate subjects (p.8). The observations relating to the use of a thematic approach involving interdisciplinary instruction resulted in better learning. Additionally, there was a greater assimilation of students into more collaborative approaches and a greater assumption of leadership roles amongst students. An interdisciplinary approach resulted in students engaging in a more meaningful and relevant curriculum and this significantly enhanced learning.

Morse (2008) concluded, 'Students benefit from cross-curricular education, as they are encouraged to critically assess the lessons learned in each discipline and to make connections across the traditional boundaries of formal subject matter' (p.298). The findings from the studies examined by Lake (2001) demonstrate positive outcomes in how students applied skills, their faster ability to access information, the increased depth and breadth of their knowledge base,

and greater positivity. Additionally, there was more opportunity for teachers to work together to develop curriculum that enabled students to engage in meaningful inquiry. The Lawton (1994) study, however, suggested that there needs to be a focus principally in one discipline to provide a framework around which the related concepts, ideas, content, inferences and problems associated with a central discipline and the concerns of other disciplines should be woven. To some degree, this is the approach at the ASMS. Each Central Study is focussed around a science topic or theme and other disciplinary components spin off around that.

A contemporary example of a successful whole school interdisciplinary approach at the secondary school level is that of High Tech High *wh*ich opened in San Diego, California, in 2000 (http://www.hightechhigh.org). The school context statement, learning goals and curriculum features are consistent with an interdisciplinary approach. The learning is cross-curricula, project-based, and involves macro concerns relating to fostering curiosity and appreciating perplexity as well as the complexity associated with the assimilation and application of new knowledge. The pedagogical features include a focus on core content, thinking critically, problem-solving, collaboration, learning to learn, the development of an academic mindset, the transformation of knowledge, and deep learning. These concepts are compatible with those expressed in a number of studies. Morse (2008) referred to real world issues and problems, overlapping concepts, deep learning, engagement and involvement. Burns and Sattes (1995), Caine and Caine (1991), Dwyer (1995), and Marzano (1991) referred to critical thinking, problem-solving and higher-order thinking. Applebee (1994) highlighted reasoning, higher literacy and higher-order thinking. Knapp (1996) categorised applied knowledge, problem-based learning and constructivism but conceded, as did Gardner (1993), that deep learning through an interdisciplinary approach should concentrate on deep learning within single disciplines first.

What emerges through this discussion of literature is that while an interdisciplinary approach to curriculum delivery is not uncontested as a successful or desirable alternative to more traditional mono-disciplinary approaches, a range of case studies, ethnographic studies and reports suggest that many school sites and students benefit when an integrated, cross-disciplinary or interdisciplinary curriculum is implemented. Although some educators consider that interdisciplinarity is a fad or 'fashionable trend' (Gardner and Boix-Mansilla, 1994), historical accounts indicate that studies across the disciplines have been practised for more than a century. Nevertheless, criticisms of an interdisciplinary approach, variously defined, relate to what might be lost in a move away from mono-disciplinary subjects. The concerns expressed by a number of educators specifically relate to the diminution of fundamental knowledge or understanding of basic concepts that have been systematically developed by experts in a field over long periods of time, centuries in fact. Additionally, some critics have felt that the systematic and disciplined study of a subject within a discipline replicates the structures evident in a stable and ordered society. The fear is that changing from a familiar and time-proven mode of education to a more progressive model is likely to be disruptive to social norms established over time and, therefore, may impact on the quality of life and security (Bernstein, 1971). Amongst some educators (Hargreaves et al., 2001), there has been an expression of concern that at a systemic level any progressive change that focuses on an integrated or interdisciplinary curriculum is likely to be compromised by political injunctions or the demands of a centralised assessment authority, and accreditation requirements.

Against considerations that have focussed on the limitations of an interdisciplinary approach—loss of foundational knowledge, generalisation and superficiality, and the disruption of already established procedures and customs deeply embedded in our culture—is a large body of research and argument that supports the concept of an integrated or interdisciplinary approach. Whether dissected into sub-forms or not, fundamentally, an interdisciplinary

approach is one which draws on the knowledge, language, methodology and concepts of more than one discipline to explore or inquire into relevant themes, topics, problems, issues or bodies of work. The characteristics or qualities relevant to an interdisciplinary approach are not necessarily unique and arguably may also be relevant to more conservative curriculum development and delivery.

Fundamental to any interdisciplinary approach is the constructivist notion of inquiry. This requires a student having a clear focus on a topic, idea, issue, theme, and/or problem to be investigated. In an interdisciplinary program, this is often focussed through a Fertile Question, research topic or problem. To engage in a successful inquiry, a student needs to be actively engaged in 'problem-centering' (Nikitina, 2002), i.e. problem-posing and problem-solving, often collaboratively, and drawing on methodologies, techniques, knowledge and information and ways of knowing across a number of subjects or disciplines. This also requires an understanding of the discourses relevant to a range of disciplines, and being able to enter into a dialogue or debate that engages and challenges all students working together as a community of learners. The concept of 'opening the floor' (Cliff and Miller, 1997) moves the focus and responsibility for learning from the teacher as the authority to the students and teachers working collaboratively to pursue understanding through a variety of modes.

This case study involving the ASMS was not intended to be a comprehensive study to determine the effectiveness of an interdisciplinary approach to curriculum delivery. Rather, it was designed to provide an indicative overview based on the recollections and personal assessments of a limited sample of randomly selected graduate students and, serendipitously, what they valued in an interdisciplinary approach. An appreciation of the concepts about a curriculum founded around interdisciplinarity as detailed in the foregoing literature and links to the ASMS approach provides a foundation from which to examine the place of English in the interdisciplinary programs.

2.3 Curriculum design, teaching and learning at the ASMS

Following is a brief outline of the theoretical principles and beliefs that shaped the curriculum development and pedagogies employed at the ASMS. The foundational principles are encapsulated in the school's Context Statement(s) but are also supported by references to theories for teaching and learning espoused by various educationalists.

2.3.1 Interdisciplinarity and learning vision

The *ASMS Context Statement – 2011* (Appendix 1) is representative of the evolving Context Statements across the years 2003 to 2010. Relevant to this study are the significant principles represented in the Charter, and statements relating to the learning vision, learning principles, graduate capabilities and the role of the tutor/teacher as a mentor. These foundational principles have remained steadfast and have been pivotal to the approach to learning at the ASMS and have been central considerations in the provision of resources and curriculum delivery (See Appendix 1: Context Statement, 2011, pp. 1–12).

Interestingly, in the opening sentence of the Charter the emphasis is entirely on the ASMS as an agent to provide 'a statewide focal point for teaching and learning, professional development and research aimed at fostering improvement, innovation and reform in science and mathematics education' (p.3). While the initial emphasis is clearly on contributing to statewide professional development, the fine detail of the Charter expands this, stating that, 'The ASMS is an agency for change and enhancement of science and mathematics education for the State of South Australia and then nationally and internationally' (p.3). Additionally, in the subsequent summarised points, technology is added to mathematics and science as a key area for attention, viz., 'Provides a learning environment of leading edge and enterprise oriented science, mathematics and technology' (p.3). The Charter refers to establishing 'models of excellence in science and mathematics education'; establishing interactions with 'university and

industry scientists and educators'; being 'an agency for change'; and transforming 'students' attitudes to science and mathematics as career pathways' (p.3). One significant aspect of the Charter relates to the preparation of 'young people to be creative, informed and motivated contributors responding to professional, personal and social issues' (p.3).

Although the ASMS espouses an interdisciplinary curriculum as a key learning principle, nowhere in the Charter or the statement of the Learning Vision (p.4) for the school is there an acknowledgement of the significance of the arts, humanities or the study of language and literature as an important curriculum, or even experiential, consideration. The Learning Vision statement is wholly focussed on science and mathematics education, asserting the need for the ASMS to promote 'excellence in teaching and learning', provide 'leadership in innovation and reform of learning and teaching', and to develop a learning environment to promote passionate, creative, critical, informed and motivated students in their pursuit of learning in mathematics and the sciences, enabling them to contribute effectively to 'the world of the future' as global citizens (p.4).

The focus on diverse cognitive practices and abstract thinking has a particular place in the Mathematics and Abstract Thinking Central Study at the ASMS. However, the approach is not peculiar to mathematical studies but is intrinsic to all the Central Studies at the ASMS. Hargreaves et al. (2001) recognised that mathematical studies are some of the hardest to integrate into an interdisciplinary approach and consequently concluded that where this occurs some of the material, content and context, might need to be handled 'in more specialized ways' (p.108). This was true in relation to the Mathematics and Abstract Thinking Central Studies program at the ASMS from 2003 to 2010. At the heart of the curriculum delivery at the ASMS is collaboration and this involves an often vigorous and certainly a focussed deliberation in the search for new knowledge and understanding. Students engage in the following: abstract thinking; the

application of higher-order thinking skills; demonstrating curiosity; problem-posing and solving; the application of their learning to solving contemporary real life problems; using imagination, creativity and invention; developing skills in collaboration but also the ability to work independently; and communicating effectively to familiar and to less familiar audiences. These are at the heart of developmental processes for learning, constructivist practices and inquiry processes (Hargreaves et.al., 2001; Harpaz, 2003; Vygotsky, 1978). Cliff and Miller's (1997) analogy of the 'dance of [the] creative and [the] critical' (pp.6ff) is apt for an interdisciplinary approach involving the arts, the humanities, the sciences and mathematics.

2.3.2 Learning principles

The summary of Learning Principles in the Context Statement (2011, p.4) are essentially unelaborated statements. However, they provide a comprehensive overview of what appear to be the pervading and continuing principles that underpin considerations that determine the nature of the units of study, the resources required, specific tasks and approaches to learning, as well as assuring parents and students that external systemic requirements, the *Standards of Significance* relating to the SACE or national curriculum criteria, will be met. The Learning Principles acknowledge the need to engage the New Sciences, such as nanotechnology, aquaculture, photonics, polymers, and areas of communication technology, amongst others (p.4).

Inquiry learning (Context Statement, 2011, p.4), closely associated with constructivist approaches, is a central concept to promote deep learning, develop a variety of approaches to problem-solving and foster the capacity for abstract thinking. The interdisciplinary curriculum is an important vehicle to enable this to happen. However, the emphasis in the Learning Principles as stated in the Context Statement is clearly oriented towards science and mathematics learning rather than being more holistic. The statement relating to the Interdisciplinary Curriculum refers to it as, 'building programs with a

focus on scientific and mathematical processes in ways that are closely linked with learning from all areas of study' (Context Statement, 2011, p.4). This is further elaborated in the ASMS Research Agenda section of the Context Statement which refers to 'combining themes from the humanities that help connect the purpose of science to human progress and the ethical issues that need attention in the application of the sciences' (p.13). In practice, examination of the ASMS curriculum documents and units of work (See Appendices 2 and 3) demonstrates a much richer interdisciplinary diet than the above statements infer. Certainly, studies of English are infused in each of the interdisciplinary Central Studies programs though not specifically acknowledged in the school's Context Statement.

Inquiry through an interdisciplinary approach is further enhanced by a Learning Principle described as *Authentic Experience.* This is an enabling approach which encourages students to consider 'real world issues and problems' (p.4) and to draw on expert knowledge, mentors and other agents to focus on issues that demand applied knowledge. The final Learning Principle listed relates to *Engagement and Retention* but is more a learning and/or management goal than a learning principle.

A further dimension that supplements the affirmed learning principles in the Context Statement is the *Graduate Capabilities*. Until 2010, the ASMS Graduate Capabilities were very much a school-based affirmation of the broader skills, knowledge and attitudes that would fit students to become effective citizens within local, national and global communities. Since 2010, these have been reshaped to some degree to align with the Graduate Capabilities adopted by the SACE. Acknowledging these six graduate capabilities is important to this study because, as the analysis of the interviews demonstrates, students were clearly aware of the significance of these as influential factors in shaping their futures. The listed capabilities speak for

themselves and establish an expectation that at the end of their secondary schooling students will be able to:

- operate scientifically
- operate mathematically
- communicate effectively
- work both autonomously and collaboratively
- demonstrate personal and social enterprise
- demonstrate critical literacy.

Significantly, the following statement emphasises the power of connectivity, an important aspect of which is to examine a problem, issue or challenge by drawing on the information or content knowledge, ideas, problem-solving processes, and ways of communicating across discipline boundaries to develop creative and functional solutions to real problems.

> A focus on capabilities is a powerful way to develop balance and connectedness across diverse areas of learning and to promote learning that is transferable to many future elements of life (p.4).

There is an acknowledgement of the power of making connections across areas of study that will contribute to the acquisition of skills and ways of thinking that may have significance for future study, work or life in general. It is in the statement of Graduate Capabilities that a close affinity between various disciplines that contribute to interdisciplinarity becomes evident.The following diagram provides a graphic representation of how the central theories and pedagogical approaches interlink to contribute to student learning.

SOME CRITICAL LINKS for LEARNING

- SELF REFLECTION
- SELF ASSESSMENT
- ADJUSTING MENTAL MODELS TO ACCOMMODATE NEW EXPERIENCES
- ZONE OF PROXIMAL DEVELOPMENT
- MAKING CONNECTIONS
- OPEN-ENDED QUESTIONS
- DIALOGUE
- INQUIRY MOTIVATED
- ACTIVE SOCIAL PROCESS

CRITICAL LITERACY

- SOCIO-CULTURAL MODEL OF LITERACY
- SELF ACTUALISATION
- AWARENESS OF PLACE IN THE WORLD
- EMPOWERMENT – TO ACT POLITUICALLY
- TEXTUAL INTERROGATION TO CHALLENGE THE ATTITUDES, VALUES & BELIEFS BENEATH
- UNDERSTANDING HOW TEXTS ARE CONSTRUCTED
- UNDERSTANDING THAT A TEXT & LANGUAGE IS NEVER NEUTRAL

CONSTRUCTIVISM

STUDENT LEARNING

- CHOICE
- NEGOTIATION
- STUDENT-CENTERED
- RESOURCE RICH
- COOPERATIVE-ASSESSMENT
- FLEXIBLE

INTERDISCIPLINARITY INQUIRY INDEPENDENT LEARNING

- LITERARY appreciation & analysis
- LINQUISTIC
- CONTENT
- CONCEPTS
- SKILLS   INFORMATION
    Access
    Deconstruction
    Synthesis
- KNOWLEDGE
    CONSTRUCTION

Diagram 3: Some critical links for learning

In summary, the foundation beliefs and practices for learning at the ASMS, though summarily overviewed in the Context Statement, are evident in the integration in the curriculum design, the development of online resources through the electronic portal, the collaborative approach to the development and sharing of teaching resources, the construction of tasks and the rubric-supported assessment procedures, the management of class distribution and spaces, and the provision of learning support. Inquiry methodologies are integral to the interdisciplinary approach. While there are clear mandates in relation to learning outcomes—the assessments are standards-driven and evidence-based and this is reflected in the rubrics (Appendices 2 and 3: Sample Rubric for a Creative Diversity task in the Biodiversity Central Study)—there are frequent opportunities for choice, flexibility, and negotiation or co-construction of alternative ways of responding to meet assessment requirements. To this end, the focus is on personalised learning to foster independence and resourcefulness. Nevertheless, much of the learning demands engagement with others in collaborative or collegial processes. The Fertile Question, described earlier, and central in each Central Studies program, is a collaborative

exercise that requires negotiation, the development of research and problem-solving skills, consideration of differing cross-curriculum views, and decision making about how best to present the outcomes of the group investigations (Appendix 3: Communications Systems Fertile Question). These presentations call on multiple-literacies, particularly critical literacy, involving selection, analysis and the creation of new texts to promote and demonstrate deep learning.

Clearly, to enable the learning principles and practices espoused by the ASMS to contribute to the acquisition of personalised knowledge and understanding, to foster (inter)disciplinary skills, and to support the achievement of the Graduate Capabilities, there are other factors that need to be in place. The availability of an array of rich resources, including access to Flinders University resources and facilities, the provision for learning outside the immediate school environment, and the use of expert mentors, including from the university or beyond, are beneficial. Collectively, access to resources and the tailoring of the spaces within the school to work effectively for optimal learning are critical to ensure genuine engagement. Finally, the role of the teacher, quality teaching and shared or distributed leadership (including between staff and students) as highlighted in the school's Context Statement (p.12) are fundamental to the way the ASMS operates as a progressive learning facility.

2.3.3 Constructivist approach and the significance of inquiry

Taber (2011) provided an historical perspective on the evolution of constructivist theory as applied to education and learning. He described a conventional view of teaching as a binary system in which the teacher imparts knowledge and the learner imitates the teacher. Rogers and Freiberg (1994) referred to this kind of educator as the 'older conservative style teacher' where authority is invested in the teacher and the students are the passive recipients. Dwyer (1995) tagged this as the 'factory model of learning' (p.270). Taber (2011) acknowledged that at the heart of a constructivist approach is 'personal meaning-making' (p.47), that is, that each student has an

innate capacity to assimilate experiences of the world and construct a matrix of understanding about it. This view was promoted through the 1970s via the work of Piaget (1973) and the later work of Vygotsky (1978) who saw the teacher's role as that of a guide at the point where a student had reached a 'zone of proximal development' (Vygotsky, 1978, p.33). It is at this point, according to Vygotsky, that the teacher assists in guiding the learning or advising the access to resources to enable the student to grow to another level of understanding. In other words, the teacher assumes a shared responsibility with the student to progress the student's learning through an assisted process.

The view that constructivist approaches to learning involve a blend of self-direction and teacher support, of direct teaching and guided inquiry, in an environment that is student-centred and focussed on personalised learning, is central to the approach at the ASMS. It is an approach that maintains that meaningful learning is active, experiential and involves 'the plurality of the intelligences' (Gardner, 1993, p.9). Hein (1991) listed nine characteristics of constructivist learning: that 'learning is an active process'; that students 'learn as they learn' in order to construct meaning and related systems; that meaning construction is a mental process; that 'learning involves language' and vice versa; that 'learning is a social activity'; 'learning is contextual' in relation to who we are and what we know and value; 'new knowledge is based on prior knowledge'; learning takes time; and, 'motivation is a key component in learning' (pp.4ff). In order to facilitate such learning in an interdisciplinary model, the traditional curriculum and assessment processes, as well as the role of the teacher, must change as an imperative. Burns and Sattes (1995) provided an apt summary that mirrors the ASMS position:

> Successful use of the interdisciplinary approach requires a knowledgeable, confident staff. At this stage of integration, a number of changes in instruction and assessment occur. Teachers cannot rely on traditional resources such as textbooks when using this approach; they must be confident in using multiple learning resources within, and, perhaps, beyond school

walls. They begin to develop problem-based, student-centred instructional activities that enable students to become more collaborative, self-directed learners. Teachers at this stage also adopt new methods for students' assessment that are standards-based, rather than standardised and emphasize process as well as product. Assessment is formative as well as summative and becomes an ongoing part of the instructional process that is done *with*, not *to*, students. Consequently, these changes require less teacher direction and more facilitation. As one teacher put it: 'I've become a guide on the side not a sage on the stage.' Finally, teachers at this stage work collaboratively because this approach requires teams with blocks of planning and teaching time (p.21).

2.4 English, contemporary theory, practice and interdisciplinarity

Following is a review of the thinking of a number of key academics and educationalists relating to the changing nature of English both as a school subject and as a discipline. The Chapter has pertinence particularly for the ASMS curriculum leadership team and provides a background for the conclusions presented in Chapter 6 particularly in relation to teaching English as part of an interdisciplinary program.

A number of factors provided challenges in the implementation of an interdisciplinary approach incorporating studies of English. These included: the changing nature of English as a discipline as conceived by academia and as a subject in the secondary school context, the evolution of new communication technologies and access to texts, the external political pressures manifested in the proposed national curriculum, and the changing requirements asserted by state certification authorities.

In an extended analysis and discussion of the changing nature of English Studies, Rob Pope (2002) recognised that English as a discipline and as a school subject was changing, that there was considerable debate between the 'literary' pursuits as opposed to a focus on 'language' study and literacy. He asserted that:

The overall trend is still clearly towards a multi-cultural and cross disciplinary construction of the subject. This is manifest in attention to previously marginal or excluded genres such as life-writing (auto/biography), travel writing, and utopian and science fiction; and above all in an increasingly broader and deeper engagement with post-colonial and women's writing, literatures in English (plural) and, latterly, gay writing (p.5).

Pope referred to English as an 'interdiscipline' (p.13). Having noted the trend, Pope presented a challenge about the redrawing of the borders or 'map' of the nature of English itself and foreshadowed the need to fundamentally 're-negotiate' what may be meant by a discipline called English (p.6). This clearly is a pertinent discussion for the ASMS in examining how new ways of communicating across the arts, humanities and sciences is impacted by evolving understandings about how learning occurs, new and emerging information technologies, and political pressures to improve literacy and numeracy achievement amongst students of all ages. Pope added another complexity in asserting that English is no longer a single entity but that there are multiple Englishes each with a special purpose, function and relevance (p.11) and that this is further complicated by contrasting 'local' socio-cultural manifestations and wider 'global' imperatives (pp.7–9). Misson (2012) agreed with the need for English to re-invent itself adding as an imperative that studies in English 'give students the textual control that they need to engage in all the material, social and personal aspects of their lives' (pp.27–28).

Other academics have also recognised the diversity and challenges associated with the social and technological flux in the contemporary world and the consequent implications for the studies of English as a discipline. Kress (2006) believed that 'English is rapidly becoming a misnomer' (p.35). Green (2008) made clear distinctions between English as a subject and English as a discipline asserting that they 'are quite different concepts or discursive phenomena' (p.36). Green's notion was that English as a school subject is now a multi-disciplinary enterprise with studies ranging across culture, media, communication,

language/linguistic, semiotic/iconic and literary studies (p.36). As did Pope, Green recognised the diversity of cultures in what he terms 'clearly a heteroglossic nation' (p.37) and this he concluded impacts on the way English is perceived compared with the Leavisite era before the ascendancy of the Growth Model of English in 1966 (Dixon, 1967) and the innovations of the London School.

A brief overview since 2000 of the premier publication for the Australian Association for the Teaching of English, *English in Australia,* provides an insight into the complexity of the debate about how to define English. Homer (2007) acknowledged the cultural aspects of language and literary studies but appreciated a growing complexity of 'educational aims, subject matter and teaching methods with which it [English] deals' (p.18). This complexity is further compounded by rapidly changing communication technologies—technologies effectively incorporated into the ASMS interdisciplinary programs. In discussing the place of English in the Central Studies interdisciplinary programs, the interviewees recognised the opportunities provided by technological innovation to construct texts and present responses to texts in new and exciting ways relevant to their contemporary worlds. This aligns with Homer's challenge to design curriculum that balances 'the parallel growth of a discourse of curriculum which fosters stasis, alongside an immensely mobile and diverse, technologically innovative culture of communication' (p.23). Walsh (2006) engaged a post-structuralist approach that demands that students question the 'validity or value' of the texts that shape their worlds and consequently understand the significance of multi-literacies (p.50). Winch (2007) pursued the importance of critical literacy and the development of understandings 'of the powerful discourses that shape our thinking about the institutions that underpin our world' (p.49). Sawyer (2007) focussed attention on the 'powerfully literate person' and illustrated his point about engendering a 'genuine respect for the Western canon' by reference to Shakespeare and contemporary engagement, commenting that, 'Shakespeare cannot be 'for all time' if readers cannot read him for their own time' (p.45). Misson (2005) drew

attention to language and literacy and the importance of communication in our personal and workaday lives. In 2012, Misson developed this idea further, defining five critical interrelated elements important within the English curriculum—'critical analysis, imagination, affect, ethics and belief' (pp.25-33). It is clear that literacy has become a central platform in the establishment of educational goals, and that the importance of critical literacy through the analysis of texts both within and beyond school is undeniably important. However, as Cumming, Kimber, and Wyatt-Smith, (2012) observed:

> Whether subject English is understood as a foundational discipline for achieving academic and future career success, or as a window into the nation's literary heritage, a uniform goal is the enhancement of student's abilities to read, write, speak, interpret, appreciate, critique and create a range of genres including print and non-print texts (p.10).

It seems clear that in designing and re-designing future interdisciplinary programs at the ASMS, teachers will need to be cognisant of the changing focuses and discourses pertinent to the subject English and the emerging communication technologies that might impinge on curriculum delivery.

CHAPTER 3: RESEARCH METHODOLOGY

Because this study was site specific, case study was an obvious research approach. This chapter details the appropriateness and significance of employing narrative inquiry as a preferred method providing tools to elucidate the case study. Additionally, the chapter describes the sampling processes relating to participants and the practical details associated with collecting the data through semi-structured interviews around questions and issues suggested to frame the discussion.

3.1 A case study employing narrative inquiry methodology

At a fundamental level, Connelly and Clandinin (1990) and, later, Clandinin and Connelly (2000), Clandinin and Rosiek (2006) and Clandinin, Pushor and Orr (2007) claimed that a key interest in narrative inquiry as a research methodology in education relates to the predilection of teachers or educators as story tellers. However, at a deeper level, story or narrative as a tool for educational research relates to the 'construction and reconstruction of personal and social stories' (Connelly & Clandinin, 1990, p.2) that collectively manifest representations of real worlds, a point also emphasised by Webster and Mertova (2007) and alluded to by Josselson (2006). In a review of the 'state of the art' of the nature and function of narrative research, Smith (2007) asserted that the representation and reliability of narrative inquiry is open to 'tensions and connections' and 'contrasts and disparity' (p.392). The counter argument to this is to acknowledge that the qualitative data acquired through narrative inquiry are bone fide representations of the personal experiences, values and meanings of the participants and that integrity is achieved through the expression of those experiences (Trahar, 2009).

By their very nature, narratives are open to interpretation or inference. Interpretivism involves research aimed at understanding the culture, the practices, or the various phenomena associated with a particular site (Schwandt, 2000, p.191)—in this case, the ASMS. While there has

been much debate about the nature of qualitative data gathered in studies involving the 'human' sciences, as opposed to the more quantitative empirical evidence gathered through observation and experimentation in the 'natural' sciences, the authenticity of the observations and voices from graduates who had intimate relationships with the ASMS case study site is difficult to question. It is significant that in this research the participants were representative of a cross section of the school population and that the interviews were conducted separately. Hence, the portfolio of personal stories when collated across the set of interviews provides a credible montage of the ASMS as an educational provider, the place of subject English within the interdisciplinary program, and the impact on the futures of the graduate students. Much of the debate about qualitative versus quantitative research has revolved around research processes such as Action Research (Checkland and Holwell, 1998; Crotty, 1998; Pike, 2002) and considerable attention has been devoted to justifying qualitative approaches as valid and reflexive, enabling 'an explicit awareness of meanings and especially assumptions' (Crotty, 1998, p.91). In spite of the openness to interpretation, 'narrative inquiry attempts to capture the 'whole story' (Webster and Mertova, 2007 p.90). Nevertheless, what evolves from the current study is more 'indicative' of the whole story rather than the 'complete' story. Webster and Mertova (2007) concluded that:

> Narrative research does not produce conclusions of certainty. In narrative-based research, validity is more concerned with the research being well-grounded and supportable by the data that has been collected. It does not provide results that provide generalizable truths, 'prescribing' how things ought to be' (p.90).

Lawrence-Lightfoot (2005) used the metaphor of 'portraiture' to describe the representational conclusions from the data analysis of the research stories and reflections evolving from the 'dialogue between art and science' (p.3). Andrews (2012) similarly adopted the representational notion and concluded that the value of told narratives is that they provide 'the very rich means of accessing inner truths,

those ideas, beliefs and commitments which an individual holds dear' (p.34). As was the case in *The Learning Lives Project* conducted through the University of Brighton, UK, the additional significant rider in this current research, was to observe how participants engendered learning—'…particularly… in life-long learning and…[through] the kinds of transitional moments of people's learning' (Goodson, 2012 p.4).

This case study has a phenomenological trait in that the phenomenon of the ASMS learning environment, the delivery of the interdisciplinary Central Studies curriculum and the place of English in it, is represented through a cumulative, mediated reconstruction based on the direct experiences of the participants. It is the product of their perceptions and recollections. Much of what has been recalled is essentially subjective and 'expressly uncritical' (Crotty, 1998 p.83) and is consequently open to interpretation and critique but the aggregation of views provides a credible composition of what existed. Crotty elucidated the point this way:

> What has emerged here under the rubric of 'phenomenology' is a quite single-minded effort to identify, understand, describe and maintain the subjective experiences of the respondents. It is self-professedly *subjectivist* in approach (in the sense of being in search of people's subjective experience) and expressly *uncritical…*the emphasis typically remains on common understandings and the meanings of common practices, so that phenomenological research of this kind emerges as an exploration, via personal experiences, of prevailing cultural understandings (p. 83).

This is also very much in the tradition of the hermeneutic circle[5], in which an inquiry begins with a foundational understanding of what is being examined and the investigative processes are designed to

[5] The hermeneutic circle consists in the fact that in the search for the meaning of a *text, of an action, of a set of ideas,* etc. the interpretation of a part requires a prior understanding of the whole to which the part belongs, and the interpretation of the whole requires a prior understanding of its parts. (Mautner, 2005, p.274)

enhance or illuminate evolving interpretations and new understandings. Crotty (1998) says, 'Another way to conceptualise the hermeneutic circle is to talk of understanding the whole through grasping the parts, and comprehending the meaning of the parts through divining the whole' (p.92). This principle contributed significantly to the decision to conduct a site-specific case study using semi-structured interviews with a limited sample of randomly selected graduates. Consequently, the resulting interpretations from the data analysis can only be seen as indicative or as 'typifications' (Bogard, 2003, p.213).

In keeping with the notion of the hermeneutic circle, a case study approach has a focus on searching out the detail and the minutiae in order to understand the whole. Simons (2009) summarised this view: 'Case study is a study of the singular, the particular, the unique' (p.3). In other words, a case study focus is unitary but seeks detail in order to understand the phenomena that characterises a particular site. There are multiple statements defining the nature and focus of case study (de Vaus, 2001; Flick, 2006; Merriam, 1998; Patton, 2002; Searle, 1999; Simons, 2009; Stake, 1995, 1998; Thomas, 2011; Yin, 2003, 2004). All have elements in common: that case study involves the deep investigation into a single event, organisation, policy or set of social behaviours. Simons (2009) summarised these aspects in a much more detailed account of what case study actually embraces:

> Case study is an in-depth exploration from multiple perspectives
> of the complexity and uniqueness of a particular project, policy,
> institution, program or system in a 'real life' context. It is
> research-based, inclusive of different methods and is evidence-
> led (p.21).

Such a definition is useful because it is to some degree open-ended but also provides an overarching umbrella for a variety of forms. Simons asserted that the 'primary purpose' (p.3) of case study is to generate deep understanding or knowledge about a topic or issue, programme, organisation, system or practice (policy) in order to

influence or inform future policy development or other forms of action (p.21). Rossman and Rallis (1998) similarly defined case study as the examination of a single instance that should lead to 'enlightenment or understanding of 'a larger phenomenon'' (p.104). Many advocates of case study, like narratologists Webster and Mertova (2007), doubt the capacity of case study processes to evolve generalisations. Thomas (2011) shares those doubts and while his more complex definition reflects similar elements to those in Simon's definition, he summarised the purpose or outcome in a much broader sense. He concluded that,

> The case that is the subject of the inquiry will be an instance of a class of phenomena that provides an analytical frame—an object—within which the study is conducted and which the case illuminates or explicates (p23).

That view supports the outcomes intended through the model of the hermeneutic circle.

To avoid the problems associated with a single definition, Stake (2000) made a distinction between three forms of case study research—intrinsic, instrumental and collective (Stake, 2000, p.437). Intrinsic case study focused on a particular case (he said, 'this case') and was developed because there was something intrinsically interesting in 'that' case in particular, without it necessarily informing 'some abstract construct or generic phenomenon' (Stake, 2000, p.437). Instrumental case study was equally purposeful but less personal and more externally focussed. This type of case study, Stake argued, crosses boundaries (what he referred to as the 'zone of combined purpose' p.437) and was important because it 'helps the researcher pursue the external interest' (p.437) While elements of intrinsic case study will be evident, there is also an aspect which may allow a greater degree of comparison or generalisability against other studies. The third form he called the collective case study which is an 'instrumental study extended to several cases' (p.437). The current case study involves the single site of the ASMS and no other comparative site. The accounts of the participants contribute to a holistic collation of what the

interviewees recalled was useful, or otherwise, from the curriculum initiatives under investigation. Rossman and Rallis (1998) stated that case studies are 'descriptive, holistic, heuristic and inductive' (p.104). This is complementary to any of the definitions detailed earlier and is not at odds with any component of Stake's three-tier formulation.

As early as 1995, Stake asserted that case study should not be deemed a 'process' (Stake, 1995, p.2) or 'method' (Stake, 2000, p.435) in qualitative research so much as an 'object' (Stake, 1995, p.2) or vehicle for the in-depth exploration of a particular research focus that facilitates the 'intrinsic interest in the case (p.3). Although others such as Simons (2009), Thomas (2011) and Yin (2003) continued to use the term, they indicated agreement. Hesse-Biber and Leavy (2011) referred to case study as 'a research strategy' or 'process of inquiry' (p.275). These terms correlate with the earlier references to a phenomenological 'approach' to an inquiry. Certainly, a variety of methodologies, tools or processes might be used within a case study inquiry to gather data, contribute to illumination or understanding of a case, contribute to an inquiry outcome, or inform analysis. This is true for the current study which has relied principally on semi-structured interviews, discussions with curriculum administrators, and curriculum and policy document searches that determined the base-line learning theory for curriculum delivery at the ASMS. This is an *emic* process to a considerable degree, that is, in the words of Merriam (1998), an attempt to understand 'the phenomenon of interest from the participant's perspective, not the researcher's' (p.6).

A case study involving the ASMS fits the criterion that case study occurs in a 'bounded' system—a concept discussed by Stake (1995, p.2). It is an aspect acknowledged by or embedded in contemporary definitions beyond that point. Merriam (1998) stated that, 'Case study...is [an] intensive, holistic description and analysis of a single unit or bounded system' (p.12). This correlates with the view by Rossman and Rallis (1998) that a feature of case study is that it is 'context dependent.' The case study focussing on the ASMS is

singularly context dependent, involving a single site and a specific curriculum direction locating the study of English within an interdisciplinary program, and consequently, with expected outcomes of interest to the school curriculum leadership team. As such, it satisfies Stake's (1998) exhortation for intrinsic case study and, to a marginally lesser extent instrumental case study, to strive for particularisation rather than generalisation. This aspect of generalisation or transferability (Hesse-Biber and Leavy, 2011) is a moot point and in Hesse-Biber and Leavy's discussion about the tensions between those promoting a positivist approach as described by Lincoln and Guba (1985, pp.24–25) and a more constructivist approach (Creswell, 2009, for instance), issues relating to validation and reliability in qualitative research emerged.

Issues relating to reflexivity, integrity and validity are significant considerations in qualitative research particularly where ethnographic processes are involved. Creswell (2007) raised the issue of reflexivity, particularly in terms of the relationship between the researchers and the participants (pp.485–486). In the collection of the data from the kind of exploratory case study conducted in this research, and the creation of the evolving narrative, the relationship between the researcher and the participants needed to be empathetic and there needed to be a shared familiarity with the culture of the site in order to develop the evolutionary understandings consistent with the hermeneutic circle model. Honesty and thoughtful reflection are keys to a successful study of this kind. Marshall (2001) referred to self-reflective practice 'as a necessary core for all inquiry' (p.433). An interesting idea that Marshall developed about the processing of data involves the notion of 'engaging in inner and outer arcs of attention' (p.433). In engaging the inner arcs, Marshall was consciously aware of her assumptions, the ways she was attempting to make meaning and to discover the 'repetitions, patterns, themes, dilemmas, key phrases' which contributed to making connections or 'multiple associations' (p.433) In engaging the outer arcs, Marshall engaged in a more objective, critical analysis, involving the raising of questions or the

consideration of emerging issues that may need to be examined. O'Brien (1998) concurred, asserting that reflexivity requires researchers to 'make explicit the interpretations, biases, assumptions and concerns upon which judgements are made' (p.3).

Brown and Jones (2001) were aware of this dilemma for the researcher as well and asked the question: 'How can a researcher both 'observe' reality as well as being part of it and thus be implicated in its continual creation and recreation?'(p.5). For qualitative research, this conjures up a dilemma relating to credibility and/or issues of validation. Brown and Jones (2001) attempted to manage this by defining the research intention as being about investigating how a particular site or organisation functions, observing what its current state is and describing these in some way. These parameters are far more open than those that apply to more 'scientific' or 'objective' research. Indeed, much of the intention in the current case study is to do with acknowledging the journeys or narratives of the participants and creating an account of what was important for them. In so doing, this involves considerable reflexivity on the part of the participants and the researcher, and acknowledgement that in the interpretative process there may be 'contradictory and conflicting interpretations' (Brown and Jones, 2001 p.6).

Merriam (1998) detailed four types of case studies based on 'intent': descriptive, interpretive, theory building and judgemental/evaluation (p.38). This case study embraces elements of three of these. While ultimately there is no intensely judgemental aspect to the study as implied in the title, there is an implicit evaluation process in that the interviewees were invited to comment on what worked effectively and what might be considered to change. Additionally, their responses were personal and thus in themselves an assessment of what they valued from the ASMS learning experience. From the outset, the intention was to provide a 'thick description' (Geertz, 1973) in relation to the site, its learning theory and charter, and to infuse the narratives and valuations of the participating graduate students within that rich

description. It was always the intention in the study to champion the voices of the participants (Creswell, 2008). The emphasis on narrative not only provides the human dimension to the study, which Brown and Jones (2001) suggested education is all about, it recognises the value of looking back as a valuable process in setting positive direction for the future. Brown and Jones said, 'We suggest that the narrative product of reflexive research might be seen as the aspirational voice that keeps emancipatory intention alive' (p.12).

3.2 Processes and practical detail

The data collection process involved a sample of eight randomly selected graduate students across the years 2003 to 2010—technically referred to as 'convenience' sample (Merriam, 1998, p.62). The selection process involved compiling a list of past students, mainly from historical records, and then making contact by email until the required number of participants had accepted in accordance with university requirements.The data collection processes involved hour-long semi-structured interviews which evolved more as a series of discussions based around a framework of prepared questions or items of interest. The dialogue that ensued between participants and the researcher was relatively organic so that, as observed by Connelly and Clandinin (1990), 'the two narratives of participant and researcher become, in part, a shared narrative construction and reconstruction through inquiry' (p.5). The discussions were fluid to accommodate unanticipated useful or interesting information. Additionally, curriculum statements, the ASMS Charter, lesson plans, limited samples of student work, internal research and planning documents and assessment rubrics were accessed through ASMS archives (See Appendices for samples). While the emphasis in presenting the data involved narration, the collation of views to uncover possible patterns of responses employed interpretive processes but was ultimately inductive in that the outcomes provided an overview constructed from a consideration of the individualised responses. In the process of reconstructing and collating the common and sometimes dissident

threads, however, care has been taken to avoid what Connelly and Clandinin (1990) have referred to as 'the Hollywood Plot' (p.10), that is, contriving to shape the data towards a happy ending or softening possible negative interpretations.

3.3 The interview questions and the significant issues for discussion

The questions that informed the interview process were established as guidelines under a set of broad headings. Following is a summary of intention.

To foreground the data gathering it was essential to work from the interviewees' understanding about how they defined English as a subject and what they saw as central within an English curriculum. To some extent it was expected that this view might be informed by their previous school experiences but also by their experiences of the interdisciplinary approach at the ASMS. Gauging differences between experiences in previous locations and the ASMS was a useful springboard to open up opportunities to explore issues beyond the framing questions. Hence, an initial reaction to a question about whether an approach in a more conventional setting was more or less beneficial than in the progressive setting of the ASMS gave each participant an open invitation for assessment and comment. The central discussion hinged around the ASMS scenario to highlight the content of and approaches to the more obviously literary aspects of the Central Studies programs and the theoretical concepts that facilitated the learning. Hence, references to constructivist approaches, including references to inquiry, active construction, collegiality, personalised learning and so on, were intentionally explicit.

Since the interviewees were graduate students who had not been at the ASMS for a number of years, the emphasis was on their reminiscences in relation to the place of English in the interdisciplinary approach to curriculum delivery. Consequently, they were asked to recall activities, topics, and approaches, and to comment on what

particularly stood out as factors that facilitated their learning—in other words, to comment on what was memorable. As a corollary to this, the interviewees were asked to isolate what was valuable to them both in the short and long terms. Two aspects were deemed to be of particular importance. The first was in relation to the inquiry processes implicit in the Fertile Question and how this impacted on them as learners. The second applied to what was taken beyond school and imported into further study, work roles or their personal lives. Assessments of personal satisfaction, achievements and needs for change were invited, particularly with reference to future education and/or employment needs. Responses to these aspects were deemed to be of interest to the leadership team at the ASMS—a significant group supporting the study. Finally, the interviewees were invited to make additional comments, raise issues or reflect further on aspects already raised, particularly, but not exclusively, in relation to English tasks and texts as part of the interdisciplinary approach.

Interview/discussion questions/areas of interest under key headings (guidelines only)

English as a discipline

How would you define or describe the subject English?

What would you see as the key priorities in the English curriculum?

English in practice

How different was your previous school experience compared with that of the ASMS?

Did you see what was done as 'English' in the interdisciplinary approach as what you perceived English to be?

Was it better or worse? In what way(s)?

English as a part of an interdisciplinary program

Did the constructivist approach live up to expectations? Were you able to negotiate, be creative or develop fresh and authentic responses that transgressed conventional interpretations and ways of responding to tasks?

Did inquiry or active construction (or a student-centred approach) mean anything to you or make a difference?

Did you feel that the processes provided greater opportunity for dialogue, collegiality or personal engagement?

Were there aspects of, or approaches to, English that carried over into the more scientifically focussed aspects of the curriculum?

What was memorable?

What topics do you recall doing?

Describe some of the activities that really grabbed your attention? Why are they memorable and what did you learn from them?

Were there other aspects apart from the learning approach e.g. the teacher, access to technology, group work etc. that made your experience memorable?

What was valuable?

What helped/made a difference?

What hindered?

Impact of further study, work or personal lives

What was useful for post-school study or work e.g. did the inquiry processes engendered in the Fertile Question, for instance, promote or develop analytical and meta-cognitive processes that were useful in post-school study or work?

Were there other aspects that carried over into post-school work or study e.g. development of communication skills or transfer of ways of problem solving or analysing data?

Overall satisfaction and achievement

Did you feel advantaged or disadvantaged in competing with students in other schools at the SACE level?

Were you satisfied with your own outcomes or achievements?

Is there a difference now compared with how you were feeling then?

Do you think that there was an adequate treatment of key areas of literary study i.e. novels, poetry, drama, film, popular media etc. (as opposed to literacy/language study) across the Central Studies programs?

Other issues/ Comments /Reflections

Feel free to make any further comments about your experiences at the ASMS, particularly in relation to English as part of the interdisciplinary program.

Diagram 4: Interview/discussion questions/areas of interest under key headings (guidelines only)

CHAPTER 4: THE GRADUATE STORIES

This chapter provides an overview of the cohort of graduates from the ASMS who participated in the study. Each interview transcript was transformed into a more conventional narrative form but care was taken to retain the key elements. While any transformation of data across genres involves layers of interpretation, care has been taken to retain the spirit, evolutionary nature and integrity of the accounts. For comparison, an example of a full interview transcript has been provided in Appendix 8.

4.1 The graduate stories

The graduates who participated in this study came from diverse backgrounds. All but one had spent two years in the interdisciplinary program and all went on to complete their SACE at the ASMS. One student repeated Year 12 in order to improve his ATAR score. Not all went on to tertiary studies or to further studies involving science and/or mathematics. Although no graduate was unhappy about using their real name in the research report, it was decided to use pseudonyms to distinguish the interviewees. Four male and four female graduates were interviewed. Their background stories pertinent to this study, the summary of their recollections and their views about studying English as part of the interdisciplinary program, are reconstructed in the order of each interview. The transcript of one interview before transformation into a more formal narrative is provided in Appendix 8.

NOTE: In the constructed narratives, English Studies (Stage 2) refers to a Year 12 English course with a focus on the study of literature, text analysis and with an external examination. English Communications (Stage 2) refers to a Year 12 English course that involved some literary and text analysis and more text construction than the English Studies program. The English Communications course was largely school assessed but was subjected to an external moderation process. The requirements for Stage 1 English Studies at the SACE level are outlined in Section 7.1 following.

4.1.1. Andy

Andy is currently working for the Australian Submarine Corporation (ASC) and is clearly very passionate and enthusiastic about his job as indicated by his gleeful exclamation at the end of his detailed explanation of the kind of work that he was doing and how he came to be there, viz. 'So, how's that for where I've been for the last three years? Or four years?' At the time of the interview, Andy was applying for a graduate position at the ASC hopefully leading to permanent full-time employment.

Andy came to the ASMS at the beginning of Year 10 but after Year 12 decided that he needed to improve his Australian Tertiary Admission Rank (ATAR) score and so he repeated Stage 2. This enabled him to successfully apply for a place in Mechanical Engineering at Flinders University. Andy commented that the university course was new and under construction and therefore 'somewhat chaotic.' He was disappointed that when he asked for help, he was 'directed to the textbook'—very different from his experience at the ASMS. After two years, Andy transferred to Mechanical Engineering at UniSA where, due in part to meet the needs of his work at the ASC, he was completing an extra course in the fifth year of what is normally a four year degree. Andy indicated that because his work at the ASC involved understanding and developing certain adhesives to replace welding, he needed to take an extra full year course about adhesives, complementing his studies in Mechanical Engineering with aspects of Chemical Engineering.

Up to the end of 2012, preparatory to starting his engineering degree, Andy had spent a couple of years working part-time for his father's engineering company doing contract work for an automotive engineering plant. This gave him experience in productivity improvement and plant maintenance. When Andy considered using this work experience as the basis for his Industry Experience Assignment as part his University coursework, he reflected critically on that and decided that he should try for a full-time twelve week

placement 'in a proper engineering company to see what working full-time was like.' Eventually, this led to a placement at the ASC and an investigation into the use of 'adhesive pins' for a particular application. The ensuing investigation and report was accepted by the ASC Engineering Department and became an alternative to the much more expensive welding process that it replaced. Subsequently, this led to a new challenge, which Andy said was similar to what he had been working on 'but much more critical.' He described in considerable detail the challenge, why it was critical, and the processes he went through to find a solution, including taking an extra university course.

While Andy admitted that experience in jobs relating to engineering, some of which coincided with study and some not, was important, the learning outside of school was but one factor that impacted on his future success. Indeed, he commented, 'I think that a big part of who I have become over the years has been because of the ASMS.' In reflecting on his schooling prior to attending the ASMS, he concluded that, even at Year 7, much of what he was expected to engage in he perceived as lacking in relevance. He commented that in Year 7 he was pressured by the school to 'keep me back a year.' Consequently, he was subjected to a range of psychological tests focussed on suspected learning disabilities. This led to him being placed in a 'learning help program.' The testing program did have a significant influence on his decision to attend the ASMS, however. The tests showed that arithmetically, in mathematical problem-solving and logical thinking, he was in the eightieth to ninetieth percentile range. In contrast, faced with the challenge of explaining ideas and concepts and presenting orally he was in the fortieth to fiftieth percentile range. This was a problem that followed him into the ASMS experience but one which Andy felt that the ASMS helped him to overcome.

It was more than relevance that Andy valued in his academic experience at the ASMS. Although he did not identify directly with the fundamental constructivist ideology underpinning the pedagogy and curriculum design at the ASMS, he elaborated processes and

practices that meant he engaged in a meaningful learning program, felt more involved and empowered than in his previous school, and was able to make individual choices that helped in maintaining interest. He illustrated this effectively by referring to a specific activity involving a study of poetry in the Sustainable Futures Central Study. While he admitted he had 'always enjoyed poetry', he was much more interested in music and when he saw that one of the poems referred to in the resource material was a song lyric by Jimmy Morrison of *The Doors* fame, he felt that he could draw on something with which he was familiar and that he enjoyed. Consequently, he was able to negotiate to focus his inquiry around song lyrics. He summed this up succinctly: 'I just did music and it allowed me to broaden the range and rather than going out and trying to find poems that fitted the topic. I could go, 'What do I already know that fits this topic? And it just meant that I could take my own direction.' This aligned with an earlier observation that the ASMS had allowed him to develop his English skills 'at my own pace on topics that I enjoyed.' This example demonstrates the capacity of the ASMS English curriculum, recognised by Andy as 'part of a bigger Central Study' theme, to encourage meaningful learning, personal relevance and to enable a celebration of prior interest or individual experience, part of what Pat Thomson (2002) referred to as the student's 'virtual backpack' (p.7)

Although Andy recognised the importance of self-directed learning, he was not uncritical of this expectation. In fact, he referred to this aspect of the approach as a possible limitation for many students who lacked skills or motivation, not only in relation to the English component. He commented, '…at the ASMS…you have to go searching for it a little bit…I don't know if it was because the school itself was so self-directed, I had issues, sort of, getting myself motivated to do the English components.' Later in the interview, Andy came back to the concept of self-direction and acknowledged that 'it [learning environment at the ASMS] has to be self-directed' but went on to assert his belief that there 'should be an underlying direction that is forced upon you to make sure that it is self-directed to a point, that you

are still learning what you need to learn.' He made the same point about his experience with the MAT (mathematics) curriculum. Andy provided two examples where approaches in relation to English tasks could have been improved. One was a failed attempt, when left alone, to complete an assignment because he claimed that he did not know what to do and was too embarrassed to ask. He felt that teachers should have been more aware and intervened, that is, been 'able to pick up when there's a problem and intervening'. However, he considered that because self-direction was a preferred mode, his dilemma was overlooked.

A second issue related to his problem with oral language and public presentations. While Andy said he felt comfortable in social situations, he lacked the ability to present in front of a class and explain what he needed to convey. There was an underlying criticism in his expressed view that 'if someone had noticed that in Years 10 and 11 and given me assistance…it would have benefitted me a lot more.' Andy's generalised solution was that students who were struggling with the 'English concepts' should be given an 'English booster' course for an hour a week to equip them with basic English skills, although he acknowledged that such a program should not be forced on people. Andy also indicated that the problem was exacerbated because so much of the material was available electronically on the school portal whereas he was 'always going to be a paper, tangible, kind of person.' This is an issue that followed him into university studies where everything is online and so he ended up downloading all the materials and printing them off.

Andy iterated several times throughout the interview that the positive approach to English and the subject matter revolved around 'science-oriented themes'. This gave him a chance, he said, to 'write about things that I was more interested in.' In spite of having a motivation problem, he felt that the Central Studies themes allowed English to be more enjoyable. He highlighted the study of the film text *Gattaca* in the Biotechnology Central Study with a focus on DNA manipulation; the

documentary in the Technological World Central Study focussing on the historical depiction and the engineering considerations associated with the construction of the Brooklyn Bridge; and the study of Michael Crichton's novel *Prey* in the Towards Nanotechnology Central Study as examples. Andy reflected on the scope of English, even if many texts were 'only fiction', to explore different ethical norms in addition to the 'study of feelings and emotions.' His evaluation here was an acknowledgement of the possibilities in an interdisciplinary approach. Although his comment was rather wordy, his summary is pertinent. He commented that '…being able to do English, study English, with the sort of scope, with a bias towards biotech or nanotech, Biology and DNA and cloning and that sort of thing, and being able to choose your kid's traits, it makes you think about where we might be in ten or fifteen years' time at a level that you probably don't think of when you are actually just doing Physics and Chemistry.' This was a recognition repeated throughout the interview about how personalising an interest in the topics studied and allowing for interdisciplinary links had a positive effect in motivating learning.

Andy was less assertive about how thinking about science 'in an English way' or from an English point of view contributed to his post-school study and work. However, he did acknowledge that he probably was encouraged to think about things that he might not have considered if he had just been studying pure mathematics and science. In a further elaboration of this thought, however, he reflected on the importance of reading, comprehending and analysing the literature, applying it to current challenges and extrapolating key elements relating to the future and to his work as important, even though these were largely scientific or technical texts. His assessment of the impact of how he learnt English at the ASMS was clear: 'I think that the way I studied English at ASMS has certainly contributed to that process—taking scientific literature and being able to comprehend it and pick it apart in a way that is not traditionally scientific—rather than just pulling facts out.' This comment provides a clear indication of

how English embedded as it was in an interdisciplinary approach had a positive impact on Andy's post-school work.

A focussing Fertile Question was an overriding unifying challenge at the heart of each Central Study. It provided an opportunity for students to collaborate, explore a question or issue, and approach possible solutions or considerations from multi-disciplinary positions. Although initially unsure about his handling of the Fertile Question, Andy's recollections were stirred through a consideration of his preferred mode for communicating his ideas. His strong preference was for report writing rather than essays or oral presentations. In considering his response to handling the Fertile Question, which could have employed texts more pertinent to scientific studies, texts more frequently related to arts and humanities, or even multi-modal texts, he provided an example of how at university he was required to write a paper about nanomaterials and fabrication. He linked his success (high distinction) to challenges that he had experienced at the ASMS: '…it's definitely the kind of work that I would have done at the ASMS …It was a, 'tell the story about this product and how it's been developed and where its future lies.'

In considering the importance of inquiry, 'a good word' as he said, Andy ruminated about the differences in approach between his former school and the ASMS. He recalled that his former school was interested in 'information retrieval' and summarising the detail, whereas at the ASMS the emphasis was on 'asking questions.' In summary Andy said that the approach at the ASMS '…sets you more on a path of…inquiry, so, going and finding information…not just retrieving facts, you are asking questions, not of anyone in particular. You are asking them of yourself, you know, using those questions in your searches to find out more information.' Later, the discussion led to a consideration of the 'Socratic Method' as an apt means of describing the methodology. In considering the role of the teacher, Andy recognised that learning and understanding was enhanced when students explored the questions and figured out the answers

themselves, rather than the teacher just providing the answers. Thinking about what questions someone might want answers to in a discussion or information sharing session has become a model for Andy beyond school. He said that focussing on the questions when trying to explain something to someone 'changes the thought processes' because the questions can focus the issue and challenge the other party to engage in the search for answers.

When asked to consider if there were things that could have been done better or improved on, particularly in relation to the way English was taught as part of the interdisciplinary program, Andy could not think of an example specific to English but approached a response through his experience in MAT. He suggested that due to the negotiable aspects of the curriculum and the focus on inquiry in the mathematics and science subjects, some areas of basic knowledge were not covered by the teacher. This, he concluded, contributed to some disjunctions in the transition from Years 10 and 11 into Year 12. He observed that Year 12 at the ASMS was the same as Year 12 anywhere else and the Central Studies program was not necessarily 'a curriculum that was aimed at preparing you for Year 12.' He felt that he did not have a full 'grasp of the whole spectrum of knowledge' required for just studying Chemistry or Physics, for instance. Earlier, however, he had admitted that he valued the preparation that the ASMS provided for study at university. He said, 'ASMS prepares you really well for university, gets you thinking at a university level, it gets you…inquiring rather than just retrieving information. It gets you thinking about questions to ask people and it gets you thinking about study and about learning in a completely different way.' Andy asserted that perhaps Year 12 needed to be done in a completely different way at the ASMS because of the constraints of the SACE [in teaching discrete subjects rather than interdisciplinary topics] and because by the time a student got to Year 12 they had 'forgotten how to learn the way Year 12 is taught.'

Having earlier in the interview struggled with finding critical points about how English was taught through an interdisciplinary approach in the Central Studies program, the issue about disjunctions in transitioning into studying the English Communications course at Year 12 was clearly articulated from his own experience. He perceived that part of the problem was to do with the course structure at Year 12 and that after having considerable opportunity through the Central Studies program to spend two years 'doing English on things that you were interested in' and drawing on a range of texts that revolved around science themes, the Year 12 program specified a more conventional choice of texts and approach to teaching and learning. In considering the problems associated with how to better integrate English across the Central Studies program into Year 12 studies of English, Andy grappled with a slight contradiction. On the one hand, he felt that English needed to stand out more in the Central Studies program and that he could have benefited from more structure. On the other hand, he admitted that he enjoyed doing English because it was incorporated into the Central Studies program in an unobtrusive way, as was Geography, History and Philosophy. He summarised this dilemma in the following comment: 'I think…it was good because I was doing English without realising I was doing English…but, I don't know, I think if it had been a bit more focussed on English I would have learnt more, sort of, English concepts.' In spite of this, he concluded that he did acquire an understanding of English concepts, particularly through the text construction aspects of the topics in the Central Studies programs and that this contributed in a supportive way to his current work and into the future.

4.1.2. Julianne

Prior to enrolling at the ASMS, Julianne completed her primary and middle school years at an elite Catholic school and normally would have progressed directly to the related Senior College. However, her brother had enrolled at the ASMS and Julianne felt that she wanted a change, and because of her brother's positive experience at the ASMS she also made this her choice. The motivating factors for change were

both social and academic. Julianne was concerned that the friendship groups with which she was associated socially and academically at her previous school would inhibit her progress and that she 'would be in the exact same place in another three years.' She commented that this fear was borne out when looking at the university experiences of many of her previous friends. She thought many of them were not trained well in completing tasks and were likewise not 'trained to be good thinkers and independent thinkers.' Because Julianne was already familiar with the ASMS and how it operated, the initial transition was made easier. Nevertheless, there were some difficulties in settling in and she did consider leaving the school before the end of the first semester. However, she chose to stay and now was able to aver that, 'I wouldn't have enjoyed school as much as I did if I hadn't gone to that sort of learning environment.' She admitted, however, that mathematics and science were not her major interests. In fact, Julianne commented that she had 'absolutely no interest in maths.' The coupling of English with the science components, however, made the science more interesting. Although she was quite successful in areas of science, she was more interested in the arts and humanities subjects. Consequently, when Julianne progressed to Year 12, her course structure was very much oriented towards these. One regret, however, was that, although she chose to do SACE options in Year 10, she did not take advantage of doing some Year 12 subjects in Year 11, an option available until 2010.

Julianne was employed part-time in fashion retail but, after a successful Year 12 and an excellent TER (now ATAR) score, she was accepted into Law at a university in Victoria and although she was quite successful she found being away from friends and family rather lonely and alienating. She also found that university tutors were often 'unapproachable', very different from the experience she had with teachers from the ASMS. Consequently, Julianne applied for acceptance at Flinders University and was given credit for studies at her Victorian university. At the time of the interview, she was in her final year of a law degree with a particular focus on

Commercial/Business law. In reflecting on her experience in going into law and business, Julianne commented that, particularly in relation to law, her involvement in studying science 'made a difference in a way.' She recognised that society is changing and that laws will 'have to adapt to compensate for that…especially in those science areas that we focussed on at the ASMS, like cloning, nanotechnology and those sorts of things.' In comparing her experience in going from the ASMS into humanities subjects rather than the other way around, she observed that 'in different fields our experiences have sort of crossed over,' really an endorsement of what interdisciplinarity was about. Her final comment on that notion was that no matter what direction people intended to go, they needed to 'sit through bits that we really didn't want to do' because it made people more informed in the end.

When asked about her recollections of English at the ASMS, Julianne bluntly asserted that 'there was no English program.' However, she then elaborated how an English focus was integrated into an overarching theme relating to the sciences around which were set 'English-like' tasks. She recalled specific aspects of these tasks including connected texts studies and essays on social issues. She specifically drew attention to the film study based on the film *Gattaca* and her being able to develop an inquiry around designer babies. She also recalled a study of the documentary about the building of the Brooklyn Bridge as part of the Technological World Central Study and appreciated the integration of texts and a more 'English way' of responding. A significant positive that contributed to Julianne's enjoyment of the English components was choice—the opportunity to choose her own texts and to 'do what we wanted,' that is, to be able to negotiate how to respond. Although she did not specifically refer to interdisciplinarity, it was clear that she appreciated that whatever was completed as an English task related 'back to that scientific background,' the theme of the particular Central Study. As to whether or not this linkage of English within the Central Studies was too narrow, limiting or constraining, Julianne made the connection between the Central Studies program and the preparation for Year 12

English Studies. She qualified her response, suggesting that the focus in English through the Central Studies program was 'absolutely not' too narrow if you were not going on to Year 12 English Studies. She acknowledged, however, that she struggled with 'analysing articles' presumably in the Critical Reading section of the Year 12 English Studies curriculum. Overall, however, she believed that although she had not had enough practice in developing her analytic skills in English, there was enough 'going on' and specific topics, such as newspaper analysis, were helpful in dealing with other forms of textual analysis. She also acknowledged it was rewarding dealing with the more philosophical and social issues, such as in a collaborative task embedded in the Towards Nanotechnology Central Study involving a simulated town meeting where the ethical and social issues around building a nano-factory in a town were discussed and then reported in a newspaper article. For Julianne this was particularly significant because she was able to consider these kinds of issues in a 'more non-scientific way.'

In response to a question about her recollections relating to the reading of texts, and specifically narrative texts and the class novel, Julianne elaborated on other key elements of the 'English' program, such as the study of poetry, writing scientific articles and writing narratives with a scientific focus, which she claimed made the task more challenging. However, she concluded, 'I can't ever remember reading a novel in class.' To contextualise this, she elaborated a connection to a much more 'classical approach' to novel study; that is, discussing particular chapters as a class, searching out themes, analysing characters and so on. She reiterated that she could not remember doing that. She did, however, recall that in the Body in Question Central Study, she was allocated to the immunology strand and was able to choose her own books relating to immunology and make decisions as a self-directed learner about how to present a connected text response. This observation drew her back to the preparation for Year 12 studies in English. She felt that for those going on to English Studies in particular, there needed to be a stronger focus

on some of the core skills. In particular, she identified text analysis, how to identify themes and how to develop an argumentative essay. She acknowledged the differences in what was required in the English Communications course compared with the English Studies course and proffered that because of her lack of enjoyment of mathematics and the sciences and her preferred interest in the arts and humanities, she wanted more. However, she concluded that for many, what was offered as English through the Central Studies program would have been sufficient. In summary, Julianne felt that English Studies Stage 2 was a subject that required a more 'traditional approach' and that there was an issue with the transition from the Central Studies program to Stage 2 English Studies that was not so significant for those going on to Stage 2 English Communications.

The Fertile Question associated with each Central Study was based on constructivist learning theory and the notion of inquiry in particular. Although students were free to choose from a multiplicity of ways to respond, Julianne indicated that her responses were mostly completed as a report. Julianne elaborated one exception where the teacher recognised her strengths and encouraged her to consider a different way to respond. While she indicated that many teachers at the ASMS had that capacity, she appreciated the flexibility offered by this teacher. The result was a poem called 'Modernity' which eventually was also published outside of the school. In considering what had happened, in retrospect Julianne remarked that she supposed she had been 'wanting to stick to her guns a little bit and claim that English area.' An outcome of this was that it gave her licence to approach the Fertile Question from a different angle 'rather than from more of a science-based background.'

Julianne also discussed how inquiry processes were part of other focuses in the Central Studies and that the same choices about responding using possible modes across the disciplines were available. She gave an example from a Physics-focussed task where her inquiry related to sound. She chose to explore different styles of

music and the impact on hearing loss and damage to ear drums but presented this as a comparative discussion rather than a scientific report. The opportunity provided for students to play 'to their strengths' was valued by Julianne and contributed greatly to her enjoyment. She summarised this point succinctly: 'I think the best thing about the ASMS was that there was really no room for failure anywhere because you could always tailor your approach to your strengths or approach it in a different way.'

In talking about the important place of oral language and the opportunity to collaborate with others, Julianne highlighted the interdisciplinary nature of the school and the supportive learning environment. While oral presentations were a significant component of conventional English programs, Julianne saw oral presentation as a common undertaking and she appreciated that because of this she was able to hone her skills. She made a particular point about how this has benefitted her in studying law at university. She commented that the caring culture at the ASMS 'meant that no one was made to feel silly.' Ironically, in commenting on the English aspects of the Central Studies programs she remarked that she was glad that they were not asked 'to present a monologue or anything like that.' Similarly, she was content that there was not an emphasis on performing drama, which was something she quite enjoyed in her former school. However, she did concede that if you loved a play or a book and other students were engaged in a presentation it could be quite an enjoyable experience.

In a more general comment on group work, Julianne discussed the way students were allocated into groups, which she compared to a very different process based on perceived ability in her university courses. She commented that because students came from a variety of ability levels there was a tendency for some to just 'cruise through.' Nevertheless, she provided an example of where the collaborative process worked well. In the Nano Fair which was the end point of the Towards Nanotechnology Central Study, she worked with two others

with whom she said she would not normally have chosen to work. However, because each of them was very good at separate aspects, they collaborated well as a team. For example, one student was 'very good with computers and he designed this amazing little structure' while she on the other hand did all the 'Englishy' things and much of the writing. Overall, they were able to share the tasks and collaborate effectively on designing and publicising their product. She concluded that the ASMS was well set up for this kind of 'work ethic' and that if you had the desire to do well, you would have succeeded. She also felt that in group work, 'if you had a few people who weren't as academically inclined…then you did push them to work…' In this regard, Julianne cited her brother's experience. He had not had a great experience at his former school, and although he did not have the same academic passion that Julianne had, the ASMS enabled him to relax and discover learning as something enjoyable.

Julianne elaborated that essay writing was an area where some improvement could have been made. She felt that no matter what kind of writing was being done, whether an essay, a report, a response to the Fertile Question, or for a poster, for instance, there were never any clear models or directions about how to construct 'beautiful sentences' or use descriptive language or use punctuation appropriately. While she felt that she had control over such aspects by Year 10, she proffered that many students did not and that too much was assumed. In fact, in group work, Julianne indicated that she did a lot of the editing and rewriting for the group because many were 'just not up to it.' There was a relatively detailed side discussion about a similar need in the teaching and learning of mathematics at the ASMS. Julianne returned to the need for more structure towards the end of the interview but she personalised the point and expanded it across the curriculum. It was clear that she was a student who liked to be well-organised and be clear about what she had to do for the English or science or mathematics components and that this forced her to 'connect everything' and consequently made her a 'better thinker, better problem-solver and better everything.' She projected this in

relation to how she observed other students responding to English: that even if they did not enjoy English as a separate discipline, they 'got the enjoyment from the fact that whatever we were doing, whatever essay we were writing, was relating back to an issue they did enjoy…it was something from two angles.' She concluded that because of the way English and science coalesced everybody was happy because they had choices about approaching a task variously.

The degree to which studying English through an interdisciplinary approach prepared Julianne for post-school study inevitably revolved more around the methodologies and learning opportunities than relating specifically to the English experience. In summary, Julianne determined that personal goal setting and time management, being given a degree of independence, and the skills associated with inquiry were significant factors in helping make a smooth transition into the university environment. She also valued the research skills, the requirement to acknowledge or reference other people's ideas, and knowing how to use a range of materials beyond set textbooks— significant expectations and procedures at the ASMS. Even though she found some university lecturers or tutors very unapproachable, Julianne did not feel intimidated approaching university tutors out of hours because she was used to doing so at the ASMS. She concluded that 'the teacher makes the subject' and that it made a difference when a teacher enjoyed teaching either at the ASMS or at the tertiary level.

4.1.3 Rosie

Rosie attended an R-3 Catholic preparatory school before transferring into a different Catholic primary school. At the beginning of Year 8, Rosie made a further transition into a public 6-12 school which incorporated a dedicated middle school program and a specialist senior school curriculum. Rosie, however, was not fulfilled and felt that she was not being challenged. She considered transferring to an elite co-educational private school where she had a friend who provided her with materials used in the private college so she could map out a learning program which she studied in her own time. While studying

the materials provided made her feel that she was 'actually learning', when it came time to seriously consider enrolment at that school she felt daunted at the prospect because of 'not having been prepared' adequately by the school she was currently attending. A boy at the private school encouraged her to consider the ASMS as 'a good place to go' and Rosie followed up and enrolled at the beginning of Year 10. She remarked that, 'I didn't have a particular love of maths and science, or English for that matter. I just wanted to learn.' Rosie completed Year 12 and went on to complete a university degree in media. Currently she is a successful practicing journalist.

Clearly Rosie had a very negative education experience prior to attending the ASMS even though there were a number of changes of schools, both public and private, in a search for an environment that provided what she needed. She commented that she 'loved telling stories' in primary school but that much of her early English involved being given a subject to write about and being sent off to do it. Rosie indicated that she really did not study literature until university and that she really only 'learnt a lot about English, that is, sentence structure, grammar and so on…when I was studying Spanish at university.' Consequently, Rosie felt that she could not offer much of a comparative insight between her early experiences in English and what happened at the ASMS. Because she had not studied Shakespeare or read novels like *To Kill a Mockingbird* or 'even analysed any literature before', she felt unprepared to choose Stage 2 English Studies and opted for Stage 2 English Communications instead. Rosie could not recall having been offered the opportunity to study *Macbeth*, which was paired with a study of picture books in one of the Central Studies. In fact, she reiterated her lack of contact with studying literature and expressed mild criticism of the scope of what she experienced. Of the English component of the Central Studies she said, 'I don't feel that we really did much at all and so it wasn't overly different' compared with her previous school. Rosie commented that she wrote a lot of reports at the ASMS but that the lack of literature

study was the reason for her choosing Stage 2 English Communications.

When asked about aspects of the English completed as part of the Central Studies programs, Rosie recalled several tasks that she really enjoyed. One was writing a science article, which she chose to do about hearing aids. She recalled having to research how articles were written. She also recalled the pleasure derived from the story book unit partly because, 'I was able to sit down and interview my friend and talk to her about her favourite stories.' [The fact that she completed the story book unit explains why she did not study the Shakespeare unit since these were concurrently run options.] Rosie also recalled enjoying poetry but one thing she excelled at was report writing—'I felt that I came out of the ASMS really, really good at writing prac. reports.' In highlighting these particular tasks, Rosie again decried the lack of opportunity to engage with literature. She noted the links with science but did not feel that this was greatly constraining though she did comment that 'it would have been nice to have been able to just focus on at least one of the subjects that was just English.' Having said that, she acknowledged that having an education that was 'completely rounded' was also important.

When discussing the constructivist learning theory, the place of inquiry and the opportunity for students at the ASMS to make choices and explore ideas, Rosie demurred, suggesting that the freedoms were not as much as people at the ASMS thought they were. To illustrate the point, she referred to a task related to the Towards Nanotechnology Central Study where a task was to write a science article. She challenged whether a student would have been allowed to write 'a human interest piece' in place of the science article because that did not fit under the science umbrella. This was also true of the Fertile Question, she thought. Even though there were different options for exploring and presenting a response to the Fertile Question, it 'always' went back to the 'science world.' There were some freedoms, however; for instance, having the opportunity to work with people in

the Environmental Health and Safety Department at Flinders University and take the findings of her research to a forum in Japan.

Later, she remarked that she really enjoyed the 'crossover between the various subjects' and 'doing some of the stuff that was more science focussed.' She said that 'it was a fun way to look at English if you loved science…' Nevertheless, the question remained—'I enjoyed the English I did but did I do enough of it?' This led her to consider the balance and whether the hours of contact added up, whether they actually did as many contact hours as would have been experienced in a 'normal' school. Rosie felt that there could have been more English in the curriculum but she did not feel that she was 'overly lacking'. She said that, 'Sometimes when we were doing English it didn't feel like we were doing English.' For instance, in studying the documentary about the Brooklyn Bridge in the Technological World Central Study she felt that she was engaged with Biology in considering how and why the workers became ill and that she was engaged in Physics when considering the engineering or construction of the bridge but did not feel that she was doing English in other tasks relating to the study. However, she conceded that the point of the Central Studies was that everything came under the 'one umbrella' so there was connectivity. Rosie felt that sometimes the science focus was to the detriment of the humanities subjects and because analysing literature or a film or writing reports that were not scientifically based required a different way of thinking, she would have liked more direction and opportunity to engage in that.

In terms of preparing for study beyond school, the ASMS fostered a background for 'independent learning.' The fact that she could challenge herself to complete some of the Stage 1 SACE units in Year 10 was valuable because it gave her more flexibility in Year 11. This gave her the feel for hard work and drive that she also carried into university studies. She appreciated that they were 'not babied along' and had to seek out many resources themselves. Additionally, she knew how to reference sources. Rosie also believed that her science

background enabled her to approach her humanities topics with a different perspective and to 'question things a little bit more.' She elaborated on this with reference to her current work as a journalist, commenting that, '…as a journalist you are not there to put your own beliefs or your own thoughts into your story. You need to look at it with more of a scientific perspective…to report on the facts and on what is actually happening…to not have …that emotive connection…and not using a lot of words in your story that put a lot of your own opinions forward.' Rosie re-emphasised the value of experiencing the 'analytical side of things' and bringing this into her humanities experience later. In relation to journalism, she also commented on how important a knowledge of grammar and sentence structure was because 'where you put things can completely change the meaning of a sentence based on the grammar that is used.' Although she conceded that by Year 10 students should have a grasp of these elements, she believed that for future groups of students more attention should be paid to these fundamental tools because she felt there were 'holes' in her English education.

In conclusion, Rosie recollected that English had 'always been fun' though some of that diminished at the ASMS. She reflected on her choice to complete a media degree and what that entailed. In relation to the ASMS in helping her prepare for tertiary study, she concluded that 'I think the ASMS provided a valuable curriculum and was valuable in structuring the person I became, to be more open-minded about things.'

4.1.4 Michelle

Michelle attended a local public primary school from R–7 where she recalled the program and teaching as being 'quite structured.' After Year 7 she transferred to a Catholic secondary school for two years before enrolling at the ASMS. Michelle reported that the experience in Years 8–9 was 'like a step by step' process which was 'quite teacher-based.' She was attracted to the ASMS because her brother was already attending and she had 'heard about the teaching style' and

that it was 'quite relaxed and that self-motivated people could do quite well there.' In fact, after she had settled in she commented that it 'felt almost like a break from high school.' She was also attracted to the curriculum that involved 'learning things that were on the edge and were happening currently.' She admitted a strong passion for the sciences which had been encouraged by her Year 8 and 9 science teacher who involved her in the experiments completed by Year 11 students. This interest was particularly directed to the biological sciences. She indicated, however, that she did not have the same passion for mathematics. During her three years at the ASMS, Michelle was heavily involved with sport and a wide range of school activities, and she was a team captain. She developed a keen interest in agriculture as a possible university study and after graduating went interstate to complete university studies in Victoria. To help support herself, she worked part-time in a cafeteria but ill-health became a handicap. At the time of this interview, Michelle was studying viticulture and was visiting South Australia to interview a number of winemakers as part of her research into various aspects of the wine industry.

Although she said it felt 'odd' not to have set English lessons, this also created the opportunity and motivation to do her own reading and writing. In retrospect, she indicated that as a consequence she developed skills in writing essays and writing up practicals. Michelle cautioned about comparing her former English experience with what she had done in senior English but observed that it was different because it was not so 'teacher-centred' and the work was not so focussed on watching a blackboard or whiteboard. Nevertheless, she felt that the expected outcomes, 'what was expected for us to learn', were clear for the English aspects of the Central Studies. She also felt that a key difference was that the skills being developed were applied rather than developed in isolation. Consequently, questioning 'When am I going to use this skill?' became redundant. This was illustrated in her recollection of a study of poetry in the Body in Question Central Study. Instead of wondering, 'What is the use of poetry?' or 'When am

I ever going to use poetry?' she saw how poetry could relate to a topic and could 'convey intricate and amazing information about complex systems and how all those work.' In the end, she enjoyed writing poetry and saw an application beyond studies of English. Michelle provided an example of this from The Body in Question Central Study. A science teacher was teaching about white blood cells in the immunology section of the course. To assist the students to understand the names and functions of the various cells she had assigned characters, such as ninja cells, to each. The teacher then asked students to write a poem about an aspect of their own choice relating to immunology. Michelle chose to write about white blood cells using the names and terms the teacher had employed as a teaching tool. Michelle recalled that the poem ended up being quite long and was only completed the night before the assignment was due. She commented that it was relatively easy to write because 'I knew what I was writing about.' The poem was eventually published and contributed to Michelle winning The Young Innovator of the Year Award. The following year the poem was incorporated into The Body in Question curriculum resources as a model.

Initially, Michelle said she did not know if she had missed out on anything in her studies of English through the Central Studies programs but commented that she did not think she had. However, when asked about whether there was sufficient preparation for Year 12 English through the Central Studies, she immediately elaborated on the lack of opportunity for literary analysis. She used the study of 'parts' of the novel *Prey* by Michael Crichton as an example. In fact, her comment was that the focus was not so much on literary analysis as 'social commentary.' In response to a reminder about the way English was related to a science theme through the Central Studies, technology, biological issues, sustainability and so on, Michelle believed that even within those boundaries 'there were always opportunities and options for learning English.' However, she re-iterated the lack of literary analysis. She admitted missing the Shakespeare component involving the study of *Macbeth* and some

other aspects of the Central Studies because she had completed her Stage 1 English and had opted to study Stage 2 Psychology. Although Michelle was not able to comment on the balance between language and literature in the English components of the Central Study, she did suggest that many students came to the ASMS without a background in basic language skills and that, as a consequence, without the necessary skills or understanding they might not have been quite as 'well off by the end of their time there [at ASMS] as they would have been in a conventional school.' She also suggested that this was not confined to English, that it was also an issue in mathematics. She implied that not enough attention was paid to basic language skills.

Michelle was asked to reflect on key learning principles that underpinned the Central Studies programs, particularly the place of inquiry in constructivist learning, and the degree to which these principles were obvious. Her immediate response highlighted the importance of higher-order or critical thinking skills. She elaborated this in terms of the stages of inquiry—focussing on a question, finding the information, 'gathering my own information and knowing how to store it and process it.' She acknowledged that inquiry was 'the most helpful skill outside of school.' Michelle was less assertive about whether there was sufficient support or guidance to assist students to inquire successfully. She likened it to a 'find your own route' process and felt that the support varied across subject areas. She said that in discrete components involving Physics and Chemistry it was straightforward but in MAT (mathematics) it 'was really difficult' and she felt that support and direction, in spite of task sheets, was lacking. By comparison, a particular aspect of biotechnology involving the design and development of websites was more supported. She conceded, however, that some of this, particularly in mathematics, was influenced by the model answers, directions about how to go about a MAT inquiry, class sizes and motivation. One aspect relating to the presentation of outcomes from inquiry processes valued by Michelle was the amount of choice or flexibility in deciding the most effective

mode of presentation. This could be in essay form, as an oral presentation, or presenting a PowerPoint, for instance.

While some components of the Central Studies were quite integrated, Michelle also recognised that other parts were clearly discrete. For instance, the weekly science practical report was a form with a language and structure particular to the sciences. This had little carry-over into the sectors which were more of a humanities focus. However, there were other parts of the courses that did connect the sciences and the humanities. One example cited by Michelle was the creation of a website in the Biotechnology Central Study where the focus was on understanding fermentation but with facets also relating to business, philosophy and values that needed to be considered. This also occurred in the study in the Technological World Central Study about the building of the Brooklyn Bridge. Michelle also recalled the study of the film *Gattaca* which highlighted both implications in science and the humanities. She remarked that this was a 'memorable study' and 'probably the most preparation I had for Year 12 English' [presumably in terms of literary analysis]. English was similarly embedded in the Variety of Life Central Study. Michelle recalled studying evolution but choosing to write an essay 'examining speech' and the 'impact on life.' A further example related to a dramatisation of a town meeting in the Towards Nanotechnology Central Study where students were assigned different roles and presented for and against arguments implicating scientific concepts, ethical considerations, social and economic consequences and so on around a simulation relating to the building of a nanotechnology factory in a township. Michelle concluded that 'the consequences from that one solution [the decision at the town meeting], there were good things and bad things that you wouldn't expect to find. And, what some people think then others give a different account.' Oral language and writing skills were developed in this process. [Part of the English assessment was students writing a newspaper account of the town meeting.] A final example which involved interdisciplinarity and demonstrated how English was incorporated related to the study of stem cells in the

Biotechnology Central Study. While Michelle was fascinated with the scientific facts about growing stem cells, she also was interested in the debate about this and the ensuing ethical discussion involving contrary arguments. In the written work to follow, Michelle recalled that they were 'never persuaded not to include our personal opinions in a scientific or objective way of writing.' She valued learning about how to 'present opinions (subjective views) in a scientific form' rather than rephrasing them into the more conventional objective scientific form. Later, she re-emphasised the importance of the links or the way the components of the Central Studies were integrated. In fact, she saw them as Central Studies rather than separate subjects.

In discussing the Fertile Question specific to each Central Study, Michelle recalled a number of actual questions, for instance, 'Is variety the spice of life?' (Variety of Life Central Study), 'Is the universe the scene for chaos?' (Earth and Cosmos Central Study) and 'Is near enough good enough?', although she could not recall to which Central Study this related. In relation to the options about reporting the findings, Michelle considered that 'it was always focussed on the science side…English always seemed like an undercurrent with the rest, it carried the rest, it was a method of communication and we learned through that focus…it was process.'

Michelle did not elaborate on the group work associated with the inquiry into the Fertile Question but did so in relation to a task in the Sustainable Futures Central Study where, to illustrate their understanding of the carbon cycle, they dressed up as various components of the cycle, a carbon atom, an animal, a tree, and performed a demonstration. She commented that the ASMS physical environment was 'conducive to group work' and that by the time they got to Year 12, people were 'very comfortable' working and presenting in groups. Michelle contrasted this with group work at university which was a less positive experience because of the environment and partly because people did not know each other very well.

Several aspects relating to the teaching of English did attract some criticism. Michelle felt that there were some things that 'should have been covered earlier in high school' but were not and should have been included more specifically in the curriculum. Some of these were to do with very basic conventions that students had missed out on. Michelle cited reminding students about the 'use of the semi colon and when to start a new paragraph' as two examples. She compared this with Physics and Chemistry where the 'basic things' were covered and she re-emphasised the need to cover the basics in English. In commenting on who taught the English component, Michelle asserted a strong preference for people who were trained English teachers because she felt that when some assignments were marked often grammatical errors or problems with structure, such as where a new paragraph should have been started, were not picked up. She also reiterated an earlier criticism that 'there should have been more critical reviews or literary analysis in the Central Studies leading up to Year 12 English' and that this should have been there whether students were going on to Year 12 English or not. However, Michelle did concede that the ASMS did well in providing experience with a range of texts; for example, 'reporting, presenting material on the website, writing essays on philosophy, hypothetical essays or creative writing…and we did have poetry…I think there was a good variety.' Michelle valued the fact that resources, assignments and so on were available electronically and could be accessed at home. She compared this with her previous schools where information had to be copied by hand from a blackboard or white board.

In a more general summation of her ASMS learning, Michelle referred to knowing about inquiry processes and the different forms of English. For example, for her 'the recount, the report, the essays, the story writing…and the website development and website evaluation' were all things that made a difference in the transition to university studies. She also valued the opportunity provided at the ASMS through the Central Studies program to travel overseas with a small group to present at a Science Fair in Singapore. Michelle concluded, 'I feel very

lucky that I had the opportunity to go to the ASMS and I look back fondly on my years there and I like to think that students in later years might feel that—because of the opportunities we had and because of the teachers we had, as well as the fellow students in the kind of environment which facilitated the learning.'

4.1.5 Abiz

Abiz provided sparse information about his schooling experience prior to attending the ASMS. His only shared recollection from his primary school days involved an anecdote about the Premier's Reading Challenge and how they were set a quota of twelve books to read but he got very enthusiastic and ended up reading eighty-four books and receiving a special award. He spoke of the experience in a large public International School, prior to attending the ASMS for the start of Year 11, as 'traditional.' English, science, technology, mathematics and other subjects were treated as separate domains. In relation to English, there were some 'mandatory texts', but beyond these there was some 'flexibility in terms of what texts we were able to choose.' Although Abiz stated that he enjoyed most of the texts offered at the ASMS more than the general English literature offerings at his previous school, he chose not to pursue either of the Stage 2 English courses for his SACE. Abiz was very aware of how the ASMS operated as an educational institution because his sister was already enrolled but he also had 'a passionate interest in science and mathematics.' Abiz successfully completed his SACE and with a high ATAR score was accepted into medical science at Flinders University where, at the time of this interview, he was completing his third year in a double degree in clinical science and medicine.

Abiz acknowledged that he could make personal choices of texts at the ASMS and that the orientation of those to science and technology contrasted greatly with the focus on traditional themes relating to culture, belonging and community studied at his previous school. He commented that this was a pleasant surprise which also catered to his love of science fiction. This flexibility and focus increased his engagement because what he was reading was more related to things

that interested him. Nevertheless, he believed that there were similarities and that overall studying English as an interdisciplinary adjunct changed very little. He commented, 'We still went through everything that's mandated in the English curriculum', that is, as mandated by the SACE requirements. He considered that 'the understanding of and analysing of texts and interpreting them…and learning literary techniques' was still covered. In response to a question relating to his perception of a constructivist approach, Abiz reiterated his appreciation of the flexibility in the course and that because he was studying texts that were of more interest he found himself 'going more in-depth.' He elaborated on this in detailing an inquiry process which led him to spend much more time reading through the chosen text but also reading material that 'related to it.' In fact, he became so interested in the topic or theme that he ended up reading the series of twelve texts. He concluded that this approach 'improved my understanding.'

How the English components were approached in the particular Central Studies programs was a matter Abiz wanted to comment on. He said that he would have 'preferred having smaller lessons and more lessons in the week.' He felt that in his previous school, because there were more lessons and consequently they saw the teacher more often in class, there was possibly more opportunity to 'discuss things, get evaluation or feedback.' On the other hand, he was also very complimentary of the fact that at the ASMS, because of the accessibility of the teachers and the 'open nature of the dialogue between teachers and students, it was possible to see a teacher at any time if they were not busy.' When urged for a point of comparison, he concluded that it was 'much easier at the ASMS.' The question about levels of support and the adequacy of this emerged again later. Abiz acknowledged that the ASMS 'put a lot more responsibility onto the students [compared with his previous school].' This was a positive for him because he liked being left to his own devices. The expectation about taking responsibility for their learning or exercising independence applied across all areas of the Central Studies. He

concluded that, 'It was up to us to go and research,' and to access the wide range of resources including exemplars available on the internet, in textbooks, and through the library. If a student needed examples, Abiz felt that they should be able to hunt these out themselves and that this was something the ASMS should continue to encourage. He commented that 'I didn't really expect the school to provide models or templates—this was not the way English was taught to me.' However, he conceded that for some students who struggled with writing skills, setting up opportunities to workshop skills would probably have been useful. This was one aspect that he considered worth investigating for the future.

Because Abiz only attended the ASMS for Stage 1 (Year 11) and Stage 2 (Year 12), there were gaps in what he experienced through the Central Studies. In attempting to recollect a study involving science fiction and technology, Abiz struggled to recall the particular study [it actually occurred in a Central Study cycle prior to his arrival at the ASMS]. However, he particularly recalled exploring and analysing a theme relating to the 'differences between humans and non-humans.' While he recalled that the study of themes occurred through all the Central Studies, there were also focusses on different techniques and methods of communication. Whereas essays were the 'standard format' for communicating understanding in English at his previous school, Abiz recalled that at the ASMS there were many other modes through which to demonstrate understanding, including posters, electronic forms and oral presentations. The opportunity to engage in interactive processes, including group work and discussion, encouraged collegiality and made a difference to the quality of learning. The sense of 'community' at the ASMS Abiz felt was 'a lot more tight knit' and the discussions about texts were interesting and helpful, contributing to the 'free sharing of ideas.' Abiz demonstrated what he meant by describing a task involving the making of a poster. Although each student might be responding to a different text and the analysis might be entirely different, each could observe what the other was doing, discuss and compare their approach or idea and learn from

each other. This way they could 'take' what they liked and develop their ideas freely. Abiz reiterated that there 'was always a good free flow of ideas.'

While the above remarks were particularly directed towards the study of English, Abiz also exemplified the point with regard to the study of mathematics. He referred to students being given 'a kind of open-ended curriculum or non-traditional instruction in maths.' As a consequence, the students could discover mathematical principles and achieve understanding through collaboration. Abiz implied that this was effective 'because we weren't being fed the information as much as we had been at another school.' He emphasised this contribution to independence in learning by asserting that it was up to them to 'go into more depth' rather than relying on the teacher and that the 'onus was on us to take that on and collaborate to help our understanding.' Abiz indicated that this also applied in the sciences and that learning was greatly assisted by developing scenarios that had applications to the 'real world.' While there was clearly an encouragement for students to search out information and exemplars, Abiz praised the on-line in-school support materials managed electronically through the Learning Management System (LMS), as it was then called. This, he said, 'was useful because it provided everything on site.' This was a revolutionary tool for him because he thought that it was relatively rare elsewhere. He particularly valued the fact that these materials could be sourced from home. The use of the LMS meant less reliance on a teacher and saved time.

Abiz was very clear about the significance and function of the Fertile Question as an interdisciplinary tool. He said it was meant to 'encompass all the different fields that were covered in the Central Study.' He referred to a Fertile Question in MAT to show how a mathematical question may also involve philosophical issues and also provide 'a good opportunity to put our English skills to use.' He noted the open-ended nature of these questions and that the onus was on the students to interpret them and 'come up with some sort of logical

argument.' Abiz particularly recalled a Fertile Question relating to the Towards Nanotechnology Central Study – 'What are nano world realities?' While he acknowledged that this had a specific reference to science, he also recognised that there were philosophical issues to be considered, and referred specifically to the Cartesian School of Thought. When asked about whether there was enough encouragement or emphasis given to responding to a Fertile Question through an English perspective given its scientific focus, Abiz felt that there was a 'good mix' even though the Fertile Question was 'geared towards scientific content.' He did comment, however, that providing a greater opportunity to respond using processes more attuned to English may have required a modification of the questions. He suggested that collating a portfolio of approaches to the Fertile Question, including English responses, through the semester could provide a useful resource. His belief was that the responses to the Fertile Question, with particular reference to English, could have been more 'integrated'.

For Abiz, the many skills developed at the ASMS that have been carried over into post-school study included personal organisation, time management, workload planning and information management. He summed this up succinctly, '…the way the curriculum forced you to work independently, the way it forced you to organise yourself and your work, the way it forced you to go out and do your own research provided valuable lessons that have helped me. Now I see those things coming into play a lot more than I did when I was in school. Now I can appreciate why those things were useful to learn…it made me a better learner.' He emphasised that the expectations about his responsibility as a learner meant that 'there was the requirement to step up your effort.'

When asked if this emphasis on self-direction applied to the acquisition of English skills, Abiz expressed the view that the English skills content was not 'markedly different' from other schools, that there was 'adequate coverage' and that he did not feel that he had

missed out on anything. He reported that those of his friends who went on to studies of English at Stage 2 'felt very adequately prepared.' Through the interdisciplinary program, Abiz felt that it helped with his general thinking, and provided a 'more rounded approach to understanding life.' While he recognised that there may not be direct transfer of skills between mathematics and English, there were ideas relating to culture, philosophy and so on that could transfer across. Further, he distinguished a difference between the place of imaginative worlds represented in English studies compared with what he called 'a quite numerically focussed' approach in mathematics and the sciences. He was emphatic about the value of this crossing-over of ideas or processes across disciplines with specific reference to philosophical or ethical issues. He cited the biological sciences, health sciences and some medical fields as examples where processes extend beyond 'core scientific methods' and involve a consideration of different mind sets, the impact on people, families or communities, and issues relating to the roles and responsibilities of a practitioner or citizen. His conclusion was that it was valid to consider 'different approaches' within a scientific field.

Abiz suggested that the development of a facility with communication, a key element of any English curriculum, was not 'starkly different from what you would find at most schools.' However, what interested him was the 'way' these skills were developed and 'how' they related to the different fields of study. While written communication was 'critical', Abiz referred especially to the range of opportunities made available through information technologies. He demonstrated his point with reference to a particular task involving the development of a website relating to the ethics surrounding stem cell research. This was not something he had experienced before but through the process he developed skills in website design that have served him well in his university studies, particularly applied to a 'personal learning project.' He also acknowledged the importance of community in this learning process and that the way he was able to use a range of alternative modes at the ASMS to demonstrate his knowledge impacted his 'view

of life, definitely.' The 'sense of community' extended to teachers as well as students. He provided references to a time when designing a poster for English and when pursuing answers to the Fertile Questions, science teachers and English teachers worked together to provide advice—whether about content, presentation or the drafting of work. He commented that, 'We had science teachers come and help with the development of those and provide feedback in terms of an assessment or just general comments and that was useful.'

When asked about what might have been improved, Abiz felt that there was nothing 'pertaining to the…English part of it.' He emphasised that he 'was happy with the way it was.' He was more critical of the design of some of the assignments in the components relating to the sciences. A particular aspect that occupied considerable discussion time related to group work and the assessments associated with it. He was concerned about the way students were often randomly allocated to groups and that where a group did not work well, the way the work was assessed was not always fair or equitable. He believed there needed to be more checks in place and that there should have been a dual assessment involving both a group and an individual component. He also commented about the often subjective nature of peer assessment and cited university examples where students often 'give harsher feedback than a lecturer.' These criticisms or concerns applied across the curriculum and not just to the English component of the Central Studies. Nevertheless, he said that in spite of not having an 'eidetic memory', in retrospect, he valued many of the skills learnt through his ASMS studies, particularly in relation to understanding different modes of communication. He illustrated this with reference to the study of a text relating to the 'theme of humanity' and his interest in 'astronomy and extra-terrestrial life.' This was enjoyable not only because of the subject and theme but also because 'I learnt a lot of critical reading skills…' This comment aligned well with his positive overall assessment of both his experience and what he learnt during his time at the ASMS.

4.1.6 Maddie

Maddie's schooling background was quite disjointed. Her whole primary school experience was based in a mining town in the west of New South Wales. At the end of primary school, due to parental occupations, she became very peripatetic. She attended high school for two years in the same location as her primary school. She then spent four months at a secondary school in a large rural centre on the New South Wales border north east of Melbourne. After this, Maddie transferred to a large public international secondary school in South Australia where she stayed for only six months. The collective assessment of Maddie's experience at a secondary level was that it was 'fairly consistent at each high school I went to.' She commented that the educational approach consisted mainly of being 'provided a task and then given feedback', a process essentially of producing 'a piece of work' and then 'they would critique you on it.' It was the difference in approach at the ASMS that motivated Maddie to attend the ASMS where she completed Years 10 to 12, including Stage 2 English Studies, and achieved a high TER (ATAR) score. Maddie clearly had a strong interest in mathematics and the sciences and after completing her SACE she was accepted into Engineering at Adelaide University and at the time of this interview was applying her skills to environmental issues, particularly water quality.

Prior to attending the ASMS, Maddie felt that the English curriculum she had experienced was relatively unstructured. It was very task-oriented and assessment driven. She recalled that there was little in the way of 'guidelines on grammar, punctuation or structure.' The approach described was a very conventional approach involving a single English teacher in a single classroom. This contrasted starkly with her experience at the ASMS. Because of the interdisciplinary nature of the curriculum and the place of English in it, Maddie indicated that at first 'it was quite difficult to adjust to the integrated nature of the school.' In fact, she felt that she needed a year to facilitate 'integration and cross-thinking and using what you learned in one area to highlight and enhance another.' She re-iterated the

difference from her previous experiences which focussed on 'individual set tasks' with no integration enabling a student to use information from one area in another. Through the interdisciplinary nature of the Central Studies, Maddie reflected that 'when we did English it wasn't really like doing English.' The structure of the Central Studies meant that studies were oriented around a science or mathematics theme or topic but whether producing a report or another piece of work it would be overlaid by the communication demands and 'the details that underline English.' Communication skills were seen to be an important base for success. Maddie provided an example of an inquiry around Leonardo da Vinci but also acknowledged the ability to choose novels or movies, particularly science fiction, to be written about 'from a science perspective.' As to whether Maddie found this limiting or constraining, she judged that for her it was. She said that it was 'a little limiting in terms of the number of writing techniques and communication methods I was exposed to.' She was particularly referring to the much more direct and analytical modes of communication associated with scientific conventions which she felt were solidly 'ingrained' and mitigated against more 'tangential' pathways.

While Maddie acknowledged the elements of choice, diversity and creativity associated with an inquiry approach, she strongly believed that any task required a product that essentially drove the outcome. For instance, she suggested that if the product were a report or essay to be presented in a particular way, this would impact on the research processes. She referred specifically to a mathematics inquiry where she attempted to 'pursue art in Maths' and explored the work of Escher 'in terms of the mathematical theory that he used in his art.' While she conceded that her response modelled an interdisciplinary inquiry, it still reflected the 'scientific method,' that is, presenting the method and results, and that this ingrained scientific methodology had the effect of limiting creativity. She qualified this to some degree in commenting that, although there was the 'opportunity to explore', the dominance of the scientific 'mind set' was a dissuader. When applying

this to the Fertile Question, however, Maddie conceded a much more liberal view asserting that 'the journey was different for everyone' and that the paths to reaching a particular point might be very different. However, she also believed that the results tended to be very similar. Nevertheless, she saw the inquiry process as 'great in terms of trying to find new ideas and thinking potentially outside of what you would normally do,' to 'learn at a tangent.' While Maddie was deprecatory of herself as an oral presenter, she valued the process particularly in the way she received 'immediate feedback' and how the presentations enabled an 'appreciation of other people's ideas.'

Because the final presentations of responses to the Fertile Questions were frequently through group participation, there was a natural progression to the consideration of collaboration or group work. This aspect of the ASMS approach she concluded was 'much better' compared to her previous experiences; in fact, she referred to it as 'a bit of a shock.' The main differences were the opportunities to 'collaborate, discuss and negotiate.' In previous school situations, the learning was 'very individualistic' and the opportunities to develop a sense of community were limited. Maddie contrasted the collaborative processes at the ASMS with group work at university and was not uncritical of the latter. She said that it was very difficult going from a 'learning environment where everyone was willing to have a discussion' to one where everyone was 'time selfish' thus impacting on the quality of the collaborations. Similarly, in relation to inquiry-based learning and the techniques that she had developed around this at the ASMS, there was nothing at university, in her experience, to support that. Collaborative learning was clearly a significant aspect of inquiry and the richness of this was summed up clearly. She said, 'At the ASMS everyone was sharing their ideas to the point where sometimes you'd have a conversation and you couldn't actually remember who came up with what at any one point in time because it was so collaborative—it was like a group-thought mentality.' In contrast, her university experience was that students only did the portions that contributed to what each individual wanted out of it. This was also

compounded to some degree at university by the inaccessibility of some lecturers whom she believed felt that 'undergraduate students were not a priority' and that they 'were fobbed off to look up certain pages or practise more exercises.' Maddie noted that this contrasted greatly with the accessibility students had to teachers at the ASMS who would support their inquiry and learning by taking time to explain, 'drawing pictures or providing a demonstration.'

These sentiments were echoed in Maddie's assessment of the English components of the Central Studies. She said she really enjoyed them and commented that before going to the ASMS she 'did not like English full-stop', that she had not liked writing reports, nor the topics chosen by the teachers because they 'weren't interesting, or…were so mundane and unoriginal…' Two main differences at the ASMS related to the level of choice and the 'creative outlet to science'. She elaborated this by comparing an 'ordinary' school with the ASMS and pointed out that in a conventional setting a student does not get to explore 'the interconnections between events in history and you don't get to have a look at how this could impact or how a particular scientific item could impact society as a whole.' While Maddie saw the links between topics as important, she also referred to the importance of English communication in discovering and reporting these links. The interdisciplinary links between the sciences and humanities components, particularly English, were enhanced through team teaching or co-teacher arrangements prevalent at the time. Maddie saw this as important because it helped to provide 'a balance of ideas' and 'allowed you to gain an appreciation of the differences of points-of-view.' Later, she also referred to the access to mentors at the Flinders University as an important contribution to the learning program.

Earlier in the interview, Maddie had indicated that she had not been particularly conscious of English being English as such. She also indicated a significant change of attitude towards her studies of English at the ASMS. In pursuing what she recalled and valued,

Maddie began by referring to a comparative text study of a movie and a book. She chose to focus on the film *Catch me if you can,* a crime thriller which she related to the Variety of Life Central Study. She was interested in the texts both because of the content and also because of the way each text was constructed. While she was intrigued by the 'mathematical way of seeing' (presumably the analytical process) and how the protagonist rorted the system, more interesting to her was the understanding of how examining different mediums can 'give an appreciation of what's possible in one communication [mode] that is not possible in another.' In revisiting this comparative text study, she concluded that when movies are made from a book she now sees the 'movie as a memory of the book', a text that is not 'exactly like the book'—hence, a different text in its own right. Clearly this was an instructive moment because she commented that this had changed her 'perspective on how books and movies can be reflected.' Some texts, such as *Bladerunner,* and *Clockwork Orange*, which she found disturbing, were not to her liking, but of these texts she had clear memories. She also referred briefly also to her oral presentation about Leonardo da Vinci in the Body in Question Central Study and a poster presentation on forestry in the Sustainable Futures Central Study but did not provide a critical analysis.

Whether the embedding of English in an interdisciplinary set of essentially science-focussed studies provided an adequate preparation for Year 12 studies was a matter for consideration. Maddie lauded the creativity that the Central Studies programs enabled but rued the fact that there were gaps for those students who did not have adequate communication skills. In going on to Stage 2 English Studies, Maddie felt that areas involving 'grammar and punctuation' were aspects that had not been focussed on in assessments, because assignments were mostly marked on content. Consequently, when she got to Stage 2 English Studies, she struggled. She said, '…it was a bit of a shock for me re-practising all of that, not just writing, but writing well.' While she concurred that it might have been fair to consider that those basic skills should already have been there, she re-iterated that

her education up to her attending the ASMS 'was not particularly formal.' As a consequence, 'there were really large gaps.' Maddie tried to rationalise this for herself, commenting on her frequent transition between schools. At a broader level, she considered the clientele at the ASMS who 'were either very gifted or very interested in science and maths.' Consequently, many may not have had the inclination or the interest in acquiring these specific basic skills. She summarised this view rather crudely, but pointedly, asserting that: 'Previously, they were not interested in, or could not have been interested in, communication, and with that kind of bias, if everyone there hated English before they got there [to the ASMS], what's to say that they are going to be any good at it?' She contrasted her own experience with that of a fellow student who excelled in English because in Maddie's view her friend had experienced a 'good education.' However, Maddie persevered and set herself a personal goal to achieve assessment results closer to those of her friend. This she was able to do because she became interested in learning 'all those techniques,' sought constructive feedback and sat down with a teacher to work through what was wrong. This was clearly an example of self-directed learning and self-motivation supported by what Maddie referred to as the 'social structure' or the sense of community of the ASMS. She was clear that this was not orientated around English per se but was pervasive across the Central Studies revolving around engagement in learning not just school attendance. The expectation to be self-motivated or self-directed was a hallmark that Maddie saw as a positive aspect of the approach to learning at the ASMS.

In discussing aspects of assessment, and the interdisciplinary nature of many tasks, for instance that there was an oral in mathematics that counted for the SACE English assessment, Maddie indicated that the shared nature of those assessments did not bother her at the time. In fact, she quite applauded this. She commented that, 'I could produce one really large thing and count it for multiple things…I could produce something that I really felt proud of—like I felt that I had achieved something.' She further ventured that focussing on smaller discrete

items seemed more like 'just ticking the boxes.' Maddie, however, was far more critical of group work assessment, not only because she found group work difficult personally but also because it was '…so highly dependent on the social factor in the group.' Her criticisms hinged around the roles and contributions of members of the group. She proffered as an example that an individual might not contribute as much as others to the ideas or content but might take on the responsibility of bringing the ideas together into 'a cohesive unit' without necessarily being given the credit for this. She emphasised that this was an issue 'peculiar to group work' and not just at the ASMS. She acknowledged the importance of group work but felt that there needed to be a process to ensure that individual contributions were appropriately rewarded and, conversely, to ensure that those who 'skive off and use everyone else's efforts for their own benefit' are not rewarded. She also asserted that the power of the group should embrace the authority to remove non-performers from it—she referred to this as 'a capitalist kind of mentality'—an implied comparison to what happens in reality in the market place. While these evaluations of assessment were directed across all components of the interdisciplinary Central Studies, they were also pertinent to the English-oriented activities as an integral part of each Central Studies program.

Although Maddie was critical of how group work was managed at the assessment level, she provided several examples which successfully contributed to her learning. One of these related to the Nano Fair, a central activity in the Towards Nanotechnology Central Study. She concurred that working in a team of three with each member assuming a particular role was 'a really useful way to do it.' She recalled that the investigation revolved around 'colour changing paint' for solar cells. Unfortunately, Maddie did not elaborate on the roles assigned to each member and the communication aspect that related to English. Rather, she became distracted about whether at that time nanotechnology should have been regarded as a technology since it was still very much in the embryonic stages of development—as Maddie put it, 'It's

not there yet.' A second group activity which involved assessments across various disciplines including English was to do with the simulation of an international forum to discuss climate change as part of the Sustainable Futures Central Study. This involved groups of students adopting a particular country and taking on an advocacy role to justify the country's stance on climate change to an international forum. She reflected that the activity particularly exposed 'how your biases are going to impact what you argue for.'

Maddie was critical that the ASMS did not have a library within the complex and found that the shared facilities with the university, for example Earth Sciences at the main campus, created some disjunctions within the learning environment. She also bemoaned the fact that she had not taken advantage of the opportunity available at the time to complete more SACE units at Year 10 so she could complete a Stage 2 subject concurrently with her Stage 1 studies in Year 11. In spite of this, Maddie was very positive about what the ASMS had offered. She referred to the 'open mindedness' prevalent and to the fact that teachers encouraged 'you to find your own way' but also provided 'stop posts or directions when you needed them.' She acknowledged the positive and open learning environment and the co-partnership of the teachers in the learning, that 'teachers and students can be on a very similar learning plane.' Maddie concurred that the focus on inquiry was intentional, that the learning community infused an underlying respect for learning, and that the access to teachers and resources was strongly evident. Additionally, she referred to 'the lack of the tall poppy' syndrome and that 'It wasn't necessary to win an argument there. It was necessary to participate in the conversation that was being had.'

While the above comments applied to all aspects of the interdisciplinary studies, including the English components, there were additional comments that were particular to the study of English. She felt that there was not 'enough constructive feedback on communication methods.' She elaborated on this, suggesting that

assessment focussed too much on the content and not enough on the method or communication skills. She felt there was not enough feedback on communicating well. Although not an English task, Maddie singled out writing a science report as an example of a lack of support about communicating in an appropriate form. She said, 'Everyone would do a different thing for a science report…You weren't given a template…' In the English components of the Central Studies, Maddie commented that there was little emphasis on 'the use of language', for example the use of the first, second or third person voice, and that there was a lack of examples to support students. Additionally, she felt that there was not enough focus on 'catching…, correcting…, and directing' students to successfully present in 'usually accepted' modes. She targeted oral presentations, asserting that 'the communication techniques…for talking to a group situation' were not taught, and that in writing, 'the idea of targeting your writing towards a particular audience wasn't communicated.' Ultimately, Maddie concluded that one of the outcomes of her studying at the ASMS was that she now appreciated 'how much communication can make a difference.'

As a footnote, Maddie indicated that she would 'highly recommend the ASMS as a place to learn' but would warn that 'the rest of the world is not like there.'

4.1.7 Jack

Jack was brought up in the country and completed his R-10 education at a large area school of over five hundred students. He had started school at an early age and to some degree Jack found this a disadvantage in terms of a lack of maturity. When he transferred to the ASMS, he would have completed Year 12 by the age of sixteen had he continued into Year 11. He and his parents felt that this was too young so when he arrived at the ASMS it was decided that he should repeat Year 10, ultimately a positive decision in his view. Although Jack reflected that much of what was focussed on in his old school was the same, especially in English, it was not 'intermingle(d)' with other subjects. During his time at the ASMS, Jack was very active in

student affairs and was seen to have strong leadership capabilities. This involvement was indicative of interests that influenced his post-school decisions. Although he was determined to go to university while at school, Jack did not go on to tertiary studies. In making that decision, he was concerned that he might be judged to have failed. Nevertheless, he has now completed a Diploma in Business Management with an intention of converting this into a degree as soon as possible. One service that Jack would like to have seen the ASMS offer was 'more focus on pathways other than Uni for after Year 12.' Initially, after leaving school, he worked at a large hardware store but his real interest was in travel so he left the store, travelling extensively for over a year and working in the UK before returning to Australia with a young woman who wanted to study at Flinders University. Jack returned to his former job in the hardware store and soon assumed the role of manager. He continued in this role for eight months before he resigned and joined a large travel company working in retail as a travel consultant. After two and a half years, he transferred into the corporate division of the company working as a specialist organising treks, mountain climbs, sporting events and charity rides, amongst other activities. At the time of the interview, he enthusiastically declared, 'And, that's what I'm doing and loving it.'

When comparing his experience with learning English as taught at the ASMS to his previous school, he concluded that the curriculum was very similar in that aspects such as poetry, discussions and creative writing were included. At his previous school, however, 'English was English.' Subjects were discrete so that writing in science was not judged as if it were an English assignment. He noted that at the ASMS, English was integrated with other subjects so the whole curriculum focus was 'a lot broader.' He illustrated this with reference to an essay about the history of nanoparticles which might be assessed as an English piece. This integration was such that it 'didn't feel like when you were doing Central Studies that you were doing English, that it was more of a side effect.' He reiterated that while writing an essay such as on the history of nanoparticles there would

be a consideration of the 'prose and structure' but the content would be science-related so the relationship to English was 'subtle'. As a consequence, Jack said that he had almost no memory of English in the Central Studies but recalled details of English at Stage 2 much more. He conceded, however, that because he was assessed on it, he must have been taught it. With a little prompting, and later in the interview, memory became less of an impediment. He recalled an assignment in which they had to design a zoo enclosure and write a substantial piece about it and that this had had a strong English component which he completed with considerable help. He had a vague memory of studying a book, but not the title, of having been given a choice to study a Shakespeare play, *Macbeth*, or analysing picture books, and of a study of the film *Gattaca* connected to the Towards Nanotechnology Central Study. He recalled that this study involved the examination of filmic techniques and composition and the 'English behind it in the script.' Similarly, Jack remembered choosing the physiology strand associated with the Body in Question Central Study and that his particular field involved the examination of the physics of levers and applying that to the study of how joints functioned. However, he could not 'think how English was incorporated into it' prompting him to reflect once more that 'it's so subtle—you don't even know you are doing English.' On the basis of this, and in response to a question about whether the study of English through the Central Studies interdisciplinary approach provided an adequate preparation for Year 12 studies in English, he strongly asserted that he did not think that there was 'anybody in that English Studies class that was underprepared' because they had not completed a conventional Stage 1 English program.

Jack was asked to comment on the degree to which opportunities relating to inquiry and constructivist methodologies presented themselves in the study of English as part of the Central Studies. He immediately referred to the study of *Macbeth*, which largely occurred while he was overseas. He was in London at the time and saw the play presented at The Globe Theatre. This provided a different space

in which to explore and locate the play and through negotiation he 'ended up tailoring the Central Study to be around watching the play as opposed to [a study of] the script.' This was an example of how at the ASMS he was given the 'opportunity to change depending on what we were doing, were interested in or what our life experiences were.' Similarly, he saw inquiry through the Fertile Question offering choice, flexibility and the opportunity to be adaptable. He said that the Fertile Question was 'always definitely inquiry-driven' and that it 'always made people think outside the square.' He noted that the Fertile Question allowed for multiple interpretations and responses, that 'out of a class of thirty you got twenty nine different answers…everyone went somewhere different.' He conceded, however, that the majority would have followed a scientific or mathematical pathway because that was what was embedded in them—the study of mathematics and science was why most people had come to the school. However, he named one student for whom this was different and that she was one who 'loved the English side of things' and would have chosen to have presented through an English lens. One particular Fertile Question that Jack recalled was central to the Technological World Central Study— 'Are we the controllers or the controlled?' However, the question that excited Jack most related to the Sustainable Futures Central Study. He commented that the question 'How do we think globally and act locally?' was a 'brilliant question because it had English in it, it had a politics focus, it had a world-wide citizenship focus.' He was positive about the 'freedom…to choose' how to respond to the Fertile Questions but reiterated that because the students were at a mathematics and science school that the majority chose that focus. Even within that, Jack valued the opportunity to choose how to present his knowledge or understanding in response to the Fertile Question. For him, the option of presenting orally was attractive. He felt that there were few schools that would have allowed that flexibility.

Clearly, oral presentation was a preference for Jack in other aspects of the Central Studies as well. He was very enthusiastic when recalling the Nano Fair in which his team had designed and was spruiking tyres

'that could change their tread depending on the weather conditions.' Another example where he felt he excelled was in a Sustainable Futures Central Study. In this task, students worked in teams to represent a particular country at a Global Summit. The focus was on global warming and students were provided the challenge of researching their chosen country's stand on global warming and presenting a justification for action. He recalled that many students added to the authenticity by dressing up in the costumes of the country. A panel of teachers and experts from outside the school judged the presentations both for content and presentation skills—the latter, included as part of the SACE Stage 1 English assessment. More specific to the English component of the Towards Nanotechnology Central Studies, Jack recalled a town meeting task in which various people took on roles to defend or protest against a proposal to build a nano-factory. While communication skills were important, the English part of the task was the development of a newspaper report. After much discussion on this point, Jack considered that he may not have participated in this but only been an observer. In summary, however, the opportunity to use an oral rather than a written mode for many of the Central Studies tasks allowed him to hone a skill that was beneficial beyond school. He said, '…it improved my skills as a public speaker that benefitted me a lot beyond school more than…writing would have done…it gave me a lot more preparation for the real world.' He demonstrated this value by referring to an application in his current field of work.

Jack provided an extensive commentary about what the ASMS had provided that impacted significantly on life after school. He outlined the difference between in-school, where there is a formal structure, and after-school, where a person needs to be more independent. He felt that one of the strengths of the ASMS was that it taught students how to 'learn yourself, investigate issues and deal with people.' He referred again to the frequency of presentations at the ASMS as a preparation for the corporate world and also the access to information technology. An example of the latter was learning about Excel spreadsheets, a

central tool used in his company. In comparing his earlier school experience with that of the ASMS, he commented that his previous school may have taught him the curriculum but that the ASMS managed 'to teach…the curriculum and life skills.' One of these skills was 'self-motivation.' Apart from the development of his oral language skills, Jack was unable to make an equation between English and life skills. In fact, he made the fallacious (because of the SACE requirements) statement that 'in Central Studies if you didn't want to learn the English component you didn't have to.' Clearly, Jack regarded English as being almost 'invisible' and reiterated that he saw the Central Studies as 'all science-based' and that the study of *Macbeth* and *Gattaca* were the only two aspects of English that he could recall of English in the Central Studies programs. In contrast, he could clearly recall his Stage 2 English Studies including particular poems he studied.

Although Jack claimed that he did not recall much of his English studies in the Central Studies, he commented that the more imaginative creation of worlds as seen in English overflowed into other aspects of the Central Studies. He generalised that when one is looking at and creating new worlds in science, such as to do with nanoparticles, it is a similar process to creating a new world in English through poetry and stories. He concluded, 'So, there is a massive correlation between the two. I know that people say that you do an art or you do a science and there's no link but there are links and the ASMS Central Studies proved that.' Jack conjectured though that it was more difficult to relate English and mathematics. He recalled an oral presentation in mathematics about 'dealer motives—about how to beat the system' that was an English assessment piece but that this was hard to align with the 'structured curriculum.' He elaborated the constraints due to the content to be covered which in turn meant there was less freedom and time for investigation. While the curriculum constraints and the different ways of teaching across components of the Central Studies were an issue in his view, he also concluded that often the teacher made a difference. He cited two examples of

mathematics teachers who operated in entirely different ways—one a very traditional teacher and the other a 'new age' teacher. He also applied this to English teaching and gave an example of a teacher he liked but who he regarded as a '1980s' teacher. However, even though she was 'very down the line,' he conceded that even she allowed a degree of 'flexibility.' At the time, teachers in the Central Studies were involved in co-teacher arrangements. While Jack saw some benefits, for instance, increasing the options to negotiate to do 'what you were good at', he strongly insisted that teachers who taught outside their field of expertise were less likely to inspire students. He asserted that, '…a teacher teaching something they don't know about is never a good idea', and this was a reason why he hated poetry in the Central Studies and did not recall any detail about it. The way a teacher delivers was important for Jack and he respected teachers who were passionate about their subject.

In response to an invitation to describe what he thought could have been done better, Jack spoke with confidence. He felt a serious limitation was the lack of 'technical English in the Central Studies.' He isolated teaching about different writing styles and the features of various forms, for example, the structure of a report or a story. He also pointed to a lack of instruction about language choice and the use of the conventions, such as where to use a comma. He referred to this as 'the actual in-depth structural English, what some would call basic English.' He felt that this needed to be 'drummed in' more and part of the reason why it was not was 'because it was all big picture stuff.' The consequence of this for him was that he constantly made errors in his writing when it came to writing at the Stage 2 level, even though he felt his overall style was fine. He commented that there was teaching about the beginning, middle and end in story writing and about sentence composition but 'nothing about commas, apostrophes, full stops.' He discounted the idea that the oversight may have been due to it being presumed knowledge when students arrived in Year 10. He asserted the view that, 'even if it was presumed knowledge, it should have been reinforced.' Jack was also critical of the lack of teaching of

presentation skills. Personally, he tended to opt for oral presentations because he had the skills but he implied that this was not the case for all students and that teachers were 'probably assessing presentation skills but maybe not teaching them.' At this juncture Jack reiterated his view about teacher preparation, that a problem was that a teacher at the ASMS tended to become a 'Jack of all trades' and as a result some of the 'presentation skills or technical English skills' were missed. He summed up the point, 'Whereas, at a conventional school, a good English teacher would teach English…a good English teacher at the ASMS teaches biotechnology.'

In summarising what he valued from the ASMS experience, Jack referred only in a limited way to what evolved from his English studies, but more generally about the approach to learning implemented at the ASMS. He referred firstly to the development of relationships which have survived through to the present. More importantly, the encouragement to be self-directed, to be motivated and a self-learner were important traits that Jack has carried into his post-school life. He illustrated this by reference to expectations that are placed on him in his work and how this couples with the need to take the initiative to self-manage many tasks. He felt these were important life skills which relate not only to 'work, but in housing, relationships and friends.' Time management was also an attribute that Jack valued from his experience at the ASMS. An important component in fostering this was the forty minute Tutor Group time, which enabled Jack to use the time flexibly to negotiate space to go and get advice and complete work as well as be involved in 'sex education and the drugs education' amongst other things. Because of the accessibility of staff, Jack developed skills that enabled him to approach people confidently. He commented that, 'Knowing how to approach people who are above you—a lot of people were terrified at that—and I know that in a lot of conventional schools students are terrified to go and ask a teacher for help.' Jack said he does not feel the same apprehension when needing to approach his CEO, for instance. For him, much of this is to do with effective communication—a skill he had earlier indicated had

been finely honed at the ASMS because of the opportunities to present on a regular basis.

Although Jack did not make the connection specifically, the implication was that all of the above applied across all of the Central Studies, including the English components. While Jack felt that the study of novels provided knowledge that was not likely to be used in the workplace, the teaching of press releases or how to write proposals for a contract was 'more life focused.' Hence, he valued activities such as writing a newspaper article as a particular form. Interestingly, as a result of this evaluation, Jack wondered if he may have been better off 'doing the other English class' [English Communications] at Stage 2 because it was more practical. Jack valued the Learning Management System because it provided access to assignments and the assessment rubric but conceded that he probably did not use it well due to laziness or immaturity. In hindsight, he indicated that he would have liked to have had more resources, models or templates to access.

The opportunities to take on leadership responsibilities and engage in fundraising for charity groups and playing sport were significant and contributed to life-skills. He specifically referred to the travel opportunities that were made available to him through the school, including to China and the North Pole, as well as interstate. Finally, Jack valued the fact that his mother had a background in journalism and was able to provide some of the assistance in 'practical English knowledge' that he felt had not been available to him through the school. In conclusion, Jack asserted that he would not change the school and that in his view 'there's no other school in the state that could have prepared me for life as the ASMS did.' He felt that the ASMS gave people a 'well-rounded education'—'making educated people from educated students.'

4.1.8 Jeffrey

Jeffrey spoke very little about his primary school background but one comment indicated that the interest in interdisciplinarity was founded in

his middle school experience. It seems that his parents were aware of the possibilities. He said, 'I think my parents had discussed it. Yeah, so we were just waiting 'til Year 10 so we could actually get involved.' Jeffrey began his junior secondary education at a large public high school south of Adelaide where he observed that it offered 'a classical approach to teaching in the sense that you would have some kind of concept discussed in class and there would be homework set. You did your homework, submitted it, and got a mark or grade…a very straightforward approach…' At his former high school, Jeffrey was in a program for students with high intellectual potential and this partially provided the background to move into a more integrated type of curriculum, with more 'freedom to do your own thing', as offered at the ASMS. The approach to teaching English at his former school was progressive to the degree that responses allowed a multi-media approach, for example making a video of part of *Romeo and Juliet*, and contriving re-enactments of parts of other texts. Jeffrey completed his SACE at the ASMS and achieved a high TER (ATAR) which enabled him to enter engineering. Jeffrey commented extensively about how his anticipations actually worked out in practice. Interestingly, after completing his degree in engineering, Jeffrey had no idea about where it might lead him in future employment. At the time of the interview, Jeffrey had been working for a large engineering firm in Wyalla.

Jeffrey observed that in his junior secondary experience, English as a subject was seen to be quite 'segregated' with its own focus on writing and language. Similarly, mathematics and science were seen as discrete areas of study each with a 'different window' framing ways of looking at the world and representing knowledge. On the other hand, Jeffrey recognised a very different approach at the ASMS. He said that in relation to how discrete skills pertinent to individual subjects melded into an interdisciplinary approach, 'It was very obvious that all those kinds of skills could be transferred into other areas.' He illustrated his point with reference to report writing, noting that when you wrote a report, language needed to be adjusted for the particular audience,

rather than just imagining a form. Initially, adjusting to an approach where 'you had a bit more freedom to do your own thing…was a bit daunting.' Even though he suggested that there did not seem to be a structure, he conceded that the structure was there and made evident in drawing 'connections' and seeing how these connections applied to other components. This connection making was supported by the longer sessions experienced in the Central Studies, that is, compared to a more conventional school timetable. Jeffrey suggested that the longer sessions enabled him to engage in deeper thinking and to complete more work during lesson time.

The connection making across the disciplines that Jeffrey referred to were predicated around the constructivist process of inquiry. However, he believed that inquiry was tied strongly 'with scientific method' and the rigor associated with the science fields. He conceded that inquiry or investigation was also important in the humanities, particularly in relation to philosophy which fosters 'debate' and 'structured conversation'. Jeffrey recalled a genuine inquiry relating to the study of projectiles. He was clear about the inquiry processes that he had to work through—considering such questions as, 'What do I want to find out? How do I go about it? How do I tell people what I have found?' A further issue was concerned with how to store the knowledge for future access or reference. While Jeffrey indicated a difference in the inquiry processes expected in specific areas of the curriculum, he was less prescriptive about inquiry relating to the Fertile Question. What he liked about the Fertile Question was that 'there wasn't any right answer and…you could take it in whatever direction.' With a little prompting, several Fertile Questions were recalled. Although communication of the new knowledge gained was an important consideration for Jeffrey, any specific reference to how studies in English may have impacted on this inquiry was not evidenced.

A further attempt to uncover any perceived links between the English component of the Central Studies and the Fertile Question developed into a more general discussion of what Jeffrey recalled of the studies in English in which he did engage. He recalled 'doing a lot of creative

writing', 'other prose writing' and 'there might have been some poetry in there.' He also commented on developing the 'skill to express yourself.' He recalled looking at a segment of *Prey* by Michael Crichton in the Towards Nanotechnology Central Study. He admitted that later he did read the whole book because his interest was stimulated. With some prompting, as was the case regarding other Central Studies, Jeffrey recalled studying *Macbeth* but without elaboration. Because there was little in Jeffrey's recall of English-based activities and assignments as part of the Central Studies, it was pertinent to probe Jeffrey's perceptions of the adequacy of English studies in the Central Studies program as a preparation for Stage 2 English Studies and university studies. Jeffrey felt that through the Central Studies and all their components, key aspects were gathered and brought together 'from different sources' and that this was achieved at a 'nice pace'. He compared his junior school experience of analysis in English as 'hand waving' but that at the ASMS, 'I definitely got the impression that there was an analytical approach that involved deconstruction.' Jeffrey acknowledged that what he had experienced through the English components, but also infused across the curriculum, had been significant in terms of post-school study and work. He particularly referred to expressing 'yourself in a clear and precise way—especially in the written form.' He expanded this to include oral presentations indicating that before he attended the ASMS he was 'terrified of public speaking.' He appreciated the fact that oral presentations were so expected at the ASMS that as a consequence he developed some 'indispensable' life skills. It was clear that Jeffrey was quite self-motivated in his desire to improve. He responded to the challenge, sought out tips and tried to apply them, and gradually achieved a level of competence from which he could begin to polish his skills, 'to look at some of the very fine details about how to improve.' As examples of how school-based skills carried over into later life, he referenced several recent oral presentation opportunities in relation to his work that he felt people 'were reasonably impressed with.'

Overall, Jeffrey expressed strong satisfaction with his ASMS experience. In comparison with his university experience, he asserted that the ASMS was 'ahead of its time' in access to teachers and resources. He valued the shared expertise from teachers working in interdisciplinary teams and compared that to his current work in industry. He summarised this convincingly: 'I have found that in industry that you need that multi-disciplinary cartel of people because everyone has a certain level of expertise with something that they can bring to the table…then between everyone…you have such a depth of experience and information that you can offer.' This discussion led to a consideration of literature as a 'creation of imaginary worlds' and whether the study of literature had perhaps contributed to different ways of thinking about solutions to problems in his current work. Jeffrey referred to the film *Gattaca* and the way it raised ethical concerns and the need to consider risks and weigh them up. This he said had 'definitely carried over, especially into work now, because mining is so closely tied to stakeholders and the environment.' He acknowledged that there was a level of creativity associated with approaching a problem and finding solutions. The links the ASMS had with Flinders University and the access to university resources and the 'expanse of knowledge available through the university' were also positive aspects. In relation to learning outside of school, but related to his in-school endeavours, Jeffrey appreciated the opportunity the ASMS gave him to attend an International Student Science Fair in India.

In conclusion, Jeffrey reiterated that in terms of the treatment of literary studies through the Central Studies there was a 'good balance' in the consideration of 'a range of texts—films, books, poetry, fiction, non-fiction…and also the basic skills like writing using the correct language for reporting…' He further emphasised that the English work completed at the ASMS was 'good in forming the skills going into university and beyond.' Before attending the ASMS, Jeffrey said that he 'didn't really enjoy English.' However, the integration through the Central Studies and being able to apply skills to different applications

was 'helpful.' He did not feel that he was hindered in any way and concluded that he did not 'think there was anything they could have done better.'

CHAPTER 5: THE SYNTHESIS: A COLLATION OF THE GRADUATE COMMENTARIES

This chapter provides an account of the findings. The collation of key ideas and issues arising through the commentaries of the graduate participants involved a content analysis of each transcribed narrative against the interview questions that framed the discussions. Additional impromptu but significant comments or observations arising in the course of the dialogues were also noted and reported.

5.1 The studies of English through the Central Studies programs compared with experiences in previous schools

5.1.1 Experiences with subject English prior to attendance at the ASMS

Every interviewee had a story to tell about their experiences with English both at the primary and junior secondary levels prior to attendance at the ASMS. Collectively, the picture represented a quite structured, traditional and teacher-centred approach. Julianne and Michelle both recalled copying what the teacher presented on the blackboard or whiteboard. Michelle mimicked the typical teacher, '…sit down, books out, follow the teacher on the blackboard…' Abiz referred to the teaching of English in 'the traditional sense' and that the curriculum was delivered in a 'standard format'. Andy iterated this with an example of what traditional teaching might be seen as. He cited a typical approach involving the teacher '…telling you all that…and then when it was time for the assignment, it was, OK we are all going to the library and you're all going to find these books and summarise what you find…'

5.1.2 Perceptions of the nature of English and subject priorities in previous schools

While there was a strong recognition of English as involving the study of books or literature and writing and there was some reference to the study of grammar, the latter was not consistently mentioned as a significant focus. This was an exception for Rosie who did 'lots of

grammar' but struggled with spelling. She enjoyed constructing narratives but felt that literature was largely neglected in her junior secondary school experience. Although Maddie attended a number of primary schools and several secondary schools, she concluded that all were similarly conventional in the approach taken, or what Jeffrey referenced as a 'classical approach.' For Abiz, however, there was a slight difference to the experience of others in that his English curriculum was more culturally-based with a focus on themes such as 'belonging' and 'community.' For all interviewees it seems there was little opportunity to make choices in their previous schools; in fact, Michelle suggested that ninety per cent of the work was mandated, that is, the teachers taught what they had to teach and there was an emphasis on assignments, feedback and assessment (Maddie, Andy, Rosie, Michelle).

5.1.3 Differences in the approach to English studies at the ASMS compared with that in other schools

The degree to which the study of subject English was seen as 'segregated' (Jeffrey) or a separate enterprise in other schools was well summarised by Jack and Jeffrey. Jack commented that, 'You would go to English and your English would be English and that was it.' Jeffrey elaborated by comparing what happened in English with science or mathematics lessons. He said, '…when you are doing English…then that's when your focus is on writing and your language and when you go to Maths or Science…it's a different window again…versus when I came to the Australian Science and Mathematics School it was very obvious that all of those kind of skills could be transferred across into other areas so that when you wrote a report, for instance, you had to write using the sort of language catering for [particular] audiences.'

Jack also referred to the interweaving of conventional English with other subjects at the ASMS. He acknowledged that there were similarities in the treatment of particular content pertinent to the teaching of English, i.e. books, film, poetry etc., but that at the ASMS

these were handled in a very 'different way.' Interviewees varied in their views about the nature of English in the interdisciplinary approach. This varied from a blunt assertion that there was 'no English program' (Julianne), Rosie's assertion that she 'didn't feel that she was doing a lot of English at the ASMS', or that because of the interdisciplinary focus it seemed that 'when we did English it wasn't really like doing English' (Jack). Andy also reiterated an earlier comparison between his earlier schooling and that experienced at the ASMS. He said, 'In normal schools, English is English—that's an English class, you rock up and you have an English teacher, you study English. At the ASMS, no subject is like that.'

5.2 The significance of the interdisciplinary approach and perceived positive impacts

5.2.1 English in practice as integrated into the Central Studies programs at the ASMS

Julianne was a student who was more attracted to the literary aspects, the arts and humanities focuses in the Central Studies but referred to particular examples where interdisciplinary approaches were significant. Two of these involved the exploration of social issues in the film study of *Gattaca* in the Biotechnology Central Study and the technological and social issues associated with the documentary about the building of the Brooklyn Bridge in the Technological World Central Study. Julianne referred to the enjoyment factor and the advantage of being able to approach a task from 'two angles.' Michelle similarly illustrated the demand implicit in the interdisciplinary approach to build cross-overs between the humanities and the sciences with reference to designing a website for the Biotechnology Central Study involving the representation of fermentation processes, business, philosophy (ethical values) and the technological aspects of website design. She concluded that this was 'very helpful in seeing how the humanities connect with science and the importance of that.' She also referred to the study of the film *Gattaca* and the building of Brooklyn Bridge as important in the preparation for future study and highlighting complementary 'implications of the science[s] and the

humanities.' The value of skills being 'transferred across into other areas' was also significant for Jeffrey, and the 'umbrella' concept of the Central Studies was also acknowledged by Rosie and Abiz.

Abiz also exemplified the overarching nature of the Central Studies theme with reference to his approach to the Towards Nanotechnology Central Study Fertile Question, 'What are nano-world realities?' He commented that he was able to deeply consider the nature of realities, relate them explicitly to the sciences and apply his understandings to more general philosophical considerations. Both Julianne and Michelle referred to the use of poetry as a vehicle for conveying ideas. Interestingly, both won poetry prizes written around science themes and Michelle's poem was eventually incorporated into the curriculum resources available to all students through the electronic Learning Management System. While Maddie found that it took her up to six months to adapt to the interdisciplinary approach, in the end she saw the value of it. In her previous schooling, she commented that she 'didn't like English full stop' but she really enjoyed the interdisciplinary approach for two main reasons. The first was because of the level of choice which also enabled a 'creative outlet to science.' The second reason related to the fact that Maddie could produce more extensive pieces of work that she could feel very proud of and components of which could be assessed in multiple ways to meet the SACE requirements. Overall, there was a view, as Andy concluded, that the English 'was very successfully integrated' through the Central Studies programs.

5.2.2 Some perceived benefits of studying English through an interdisciplinary approach particularly in relation to choice and personalised learning

Underlying the view that many students understood in retrospect that they were actually 'doing' English without realising it was a compliment in relation to the success of the interdisciplinary approach. Jack provided some examples of this. One related to writing about the history of nanoparticles and although this was not a task generally associated with conventional English classrooms, it was assessed as

an English piece. He cited a similar task involving the design of a zoo enclosure which involved considerations of technology, science, mathematical calculations, design and communication. While these tasks evolved around science concepts, other tasks emanated very much from literary texts, such as the play *Macbeth* or the film *Gattaca.* The interdisciplinary demands relating to these texts ensured that incorporated into the thinking about and execution of the related tasks were considerations of ethics, media techniques, scientific concepts, social issues, technology, the paranormal and succinct communication skills. Jeffrey commented on the apparent lack of structure but asserted that this created the possibility of 'doing your own thing' and fostered the 'ability to draw connections'. He illustrated this with reference to the openness available in developing a response to a Fertile Question which could be taken in 'whatever direction'.

The opportunity for diversity of choice in tailoring responses as well as choice of texts was emphasised by several interviewees. Michelle, for instance, felt that the way English was included in the Central Studies program '…felt almost like a break…' and she relished the opportunity to choose her own books to read and to consider alternative ways of writing about them. She felt motivated by this freedom and the approach was consequently more enjoyable. Maddie found that this freedom was liberating and allowed a 'focus on using communication tools effectively'. Like Abiz, Maddie extolled the opportunity to choose science fiction and examine it from a scientific viewpoint. Abiz was particularly appreciative of the opportunity to pursue science fiction in that it integrated his love of mathematics, science and English. He commented that because he was able to study interesting texts of his own choice he was encouraged to delve into them in greater depth. He, like others, found the 'open discussion format' or opportunities for collaboration in searching for understanding stimulating and more effective than being fed information directly from the teacher. This enhanced his engagement. This was also true for Andy. The demand to be self-directed or self-motivated had the positive effect of stimulating him to play with 'English concepts.' Michelle also

commented on the levels of creativity and referred to the emphasis on group work, collegiality and the use of oral presentations. She provided an example of how this creative aspect was deployed in dressing up and dramatising an oral presentation relating to aspects of the carbon cycle. Because the approach to the studies of English was more open-ended and less teacher-directed, it was clear that for these students there were higher levels of enjoyment and engagement.

5.2.3 Inquiry and the use of constructivist pedagogies

Fundamental to the teaching and learning approaches pertinent to the Central Studies programs were constructivist processes that fostered inquiry in particular (see Appendix 1: *ASMS Context Statement,* 2011 p.4) The centrality of the notion of inquiry was a key factor in promoting the enjoyment in the learning. Part of this was due to students being given choices within the parameters of a particular Central Study. All of the interviewees referred to the importance of the choice factor though not all availed themselves of the opportunity. Julianne for instance, confessed that in the 'majority of my inquiry projects…I would have done a report'. Even so, she acknowledged that she did have choice of texts and ways of responding to them in the English-type components of the course. The poem mentioned earlier, for which she was awarded a prize, resulted from the study of 'modernity' and was her response to a Fertile Question. Jeffrey referred to a similar group decision-making process and believed that there was genuine choice, though this was contested by Rosie who thought that choice was less available than purported.

Andy recalled that he was enabled to 'take my own direction', and he valued this because being able to work at his own pace and decide how best to represent his understanding resulted in the significant development of his English skills. He recalled his study of poetry, for instance, being enhanced by his facility with music and his familiarity with song lyrics. Maddie illustrated a similar choice, though not related to an English context, when she attempted to pursue art in mathematics in a study of the mathematical theory embodied in the

works of Escher. Rosie, on the other hand, felt that there were limits to how far a student could go in negotiating alternate ways of responding. Nevertheless, like others she was able to cite an example of doing a study with the Environmental Health and Safety Department at Flinders University and that when she took those findings to present at an international student conference, she had considerable freedom about how to develop her research and present her results.

5.3 The common positives and what made a difference

5.3.1 Notable influential factors affecting positive learning outcomes

Because the approach to curriculum design was interdisciplinary, it was difficult to compartmentalise the positives in relation to English alone, embedded as it was in the Central Studies. Similarly, it was difficult to isolate how the interviewees perceived the value or effectiveness of their studies of English as having impacted on their further studies or work. Some of the positives relate to a range of factors, including: the ambience of the school; the architecture and how this facilitated learning; the joint access to Flinders University resources and the access to mentoring opportunities with Flinders University staff and other experts; the open access students had to ASMS staff; the opportunity at that time for students to complete some of their SACE units at Year 10; access to quality resources including the electronic Learning Management System; the emphasis on social cohesion—respect and acceptance in a caring environment; the opportunity to participate in international exchanges; access to extra-curricular activities including sport, fund raising etc.; and the opportunities to engage with organisations and apply knowledge in authentic contexts beyond the school walls. Additional positives include the development of techniques for effective learning, the development of communication skills and the growth of self-esteem. All of these are illustrative outcomes of the ASMS Charter for learning and of the espoused Capabilities or competencies (ASMS Charter, https://asms.sa.edu.au).

Following is a summarisation of the key positives relating to the interviewees' perceptions of the effectiveness of learning English as a component of an interdisciplinary approach.

5.3.2 Improved communication skills as a positive outcome

The development of communication skills, particularly oral presentation skills, was commonly referred to, both for the successful completion of tasks and as a life-skill for post-school study and work. For Julianne and Andy this was significant in terms of building confidence and self-esteem. For these interviewees, the skills developed were important for their post-school studies and their future or current careers. This was also true for Rosie and Jeffrey. Julianne attributed much of the success for improving oral presentation skills to the caring environment of the ASMS, referred to by Abiz as 'the lack of the tall poppy' syndrome, which encouraged a supportive approach in what was seen as a community of learners rather than a competitive individualised forum. Jeffrey provided an example of an activity that fostered strong communication skills through role play. This was the simulated World Summit on environment issues in the Sustainable Futures Central Study, involving the adoption of particular roles and researching as a team, collectively coordinating ideas, planning a presentation and presenting information and argument. The assessment was multi-faceted and contributed to a range of SACE requirements. Jeffrey also took on a chairing role—an opportunity widely available to students in a range of collaborative tasks—and concluded that this was an important learning experience that has had a lifelong impact. This Forum was also referred to by Rosie and Maddie who concurred that this was a valuable event in their learning. The emphasis on oral presentations involved both individual and group work. Julianne commented that one life-skill learnt through group work was how to work with people who held different views and had different levels of motivation. She also commented on how there were opportunities for leadership and management of groups so that each member could contribute according to their strengths. An example involved working in a group of three to develop and promote a

nanotechnology product at the Nano Fair—part of the Towards Nanotechnology Central Study. While she received mentoring in the more technological aspects of the project, she was able to mentor her fellow students in the aspects which were more to do with marketing and communication.

5.3.3 Preparation for Stage 2 studies and post-school studies

Preparation for Year 12 and beyond was also a common topic. While all interviewees generally agreed that they did not miss out on anything or that they got everything they needed, there was divided opinion about several aspects. Rosie felt there could have been more emphasis on literary analysis but Michelle and Jeffrey disagreed. Jeffrey felt there was good variety, and listed reports, website development, essays, narrative writing and poetry as important aspects. He also felt that there was a strong emphasis on analysis or deconstruction of texts and the consideration of ideas. Further, he asserted that there was a consideration of the appropriateness of language for particular purposes and within a range of genres. He recalled becoming very aware of the difference between technical and colloquial language and the differences in the choice of language appropriate to the analysis of a literary text compared to a science report. He illustrated this with reference to his current day-to-day work, that is, the distinction in the use of language in a formal technical report compared with the less formal language when working in a team with colleagues. This was at odds a little with other interviewees who felt that there should have been a greater emphasis on the treatment of the conventions of writing—grammar, spelling and structure. Overall, though, Jeffrey's summary of balance was largely shared. He concluded:

> …we considered quite a range of texts – film, books, poetry,
> fiction, non-fiction – pretty much everything and then there were
> the basic skills like writing using the correct language for reports
> and things like that.

Having said that, most interviewees agreed that grammar knowledge, for instance, rightly or wrongly, was largely assumed to have been mastered by Year 10 but that a greater consideration to honing those skills could have been addressed.

5.3.4 What was considered significant?

Jeffrey saw that although English was embedded in the Central Studies, it was still clear what was intended as an English component. Jack and Maddie disagreed, suggesting that writing a piece with a science focus even though intended as an English assessment piece was not so obvious. Jack concluded that even when considering the language and structure 'you were still getting the English but you didn't realise you were'. Rosie, on the other hand, was very aware that there were components that had a strong English bias and specifically listed researching and writing a science article, studying picture books and interviewing a friend, and writing poetry. She also acknowledged that this background in the humanities alongside her skill at writing successful science practical reports stood her in good stead when she attended university. She commented, 'I think my science background helped me come at my humanities with a bit of a different perspective maybe [compared with] those who were focussed mainly on their humanities throughout their secondary education'. Rosie, Maddie and Abiz all valued the independence in learning and the opportunity to choose. Maddie elaborated that it was important that she was 'allowed to find her own way' but that there were clear guidelines. Abiz noted that not everyone chose similar texts to analyse but that there was a level of collegiality, including support from science teachers, about developing responses, for example, designing a poster to represent his understanding of an English-oriented topic designed around a scientific concept. Maddie also recalled what she had learnt from comparing a book and film in the comparative text study, a component mandated by the SACE curriculum requirements, and how this has influenced the way she regards movies based on novels to this day.

5.4 The perceived negatives and suggestions for change

Two areas which received critical commentary related to a lack of experience with literary analysis and a lack of attention to developing conventional language skills. Two further considerations related to the skill base of teachers and the assessment of group work.

5.4.1 Training in literary analysis

Michelle and Julianne both felt strongly that there was limited opportunity to engage in literary analysis and Michelle expanded on this suggesting that even the analysis of an excerpt from the novel *Prey* by Michael Crichton was more focussed on 'social commentary' than literary analysis. For Rosie, this lack of experience with literary analysis, whether relating to a novel or film or other form of text, was a deterrent to considering enrolling in English Studies as a Year 12 subject. She was expansive on this, commenting:

> I probably would have liked to have had more direction when it came to analysing literature itself and look at something and really analyse it because that is a completely different way of thinking—you're reading between the lines and figuring out what an author or even a film director is trying to say…that's not something I really explored until Uni.

Jack and Andy had alternative views on this aspect. Jack noted that there was a lack of attention to literary analysis but rationalised that in his everyday work he would never use the language of literary analysis and that, as such, a more appropriate emphasis might have been directed to a focus on functional genres, such as how to write press releases. Andy, on the other hand, acknowledged his love of reading novels and poetry but disdained the analysis. He said, 'There's nothing that ruins a good book more than picking it apart for an essay.'

5.4.2 Teaching the conventions of written language

While not all students commented on the lack of attention to the development of techniques for literary analysis, all referred to the lack of attention to the honing of conventions relating to sentence structure,

grammar, spelling and language choice. Most agreed that these skills should have been well-established by Year 10, that it was generally assumed when students came to the ASMS that this was the case, but that it should not have been taken for granted. Michelle was aware of the lack of 'language skills' amongst students coming to the ASMS and agreed with Julianne, Andy and Abiz that many students needed more support or that there needed to be a 'more structured approach' (Julianne) to the development of fundamental skills. Jack referred to these skills as 'technical' or 'basic' and attributed the lack of attention to these to the fact that English as such 'was all the big picture stuff'. Rosie reflected that aspects of sentence structure and grammar did not assume significance until she was studying a foreign language at university. She further illustrated the importance of helping students to achieve competence with language skills by referring to her current work, saying that, '…it has become incredibly obvious how important sentence structure is, and the grammar, because a lack of understanding of grammar and how to construct a sentence can have a great adverse impact on meaning.'

Interestingly, the concerns and suggested remedies alluded to by the interviewees relating to 'remediation' for students lacking skills in the conventions of English are in keeping with the Australian Association for the Teaching of English (2009) policy re the teaching of grammar at 'high school' levels.

> What…English teachers understand about the teaching of writing and grammar, and what international research has confirmed over many decades, is that once students reach high school, whole class instruction on items of grammar does not improve students' written expression. [But] when assessment of a student's work reveals a particular area of weakness or misunderstanding across a class, it is common practice for teachers to run a 'mini lesson' in order to demonstrate to students the correct usage.
> *AATE Response to the National English Curriculum*, (2009, p.9)

The difference is that the interviewees from the ASMS suggest individual support or small group sessions for students in need and a greater awareness by teachers of the problems to determine when to intervene. In an interdisciplinary approach, the implication is that such intervention, as suggested by Davis and O'Reilly (2012), should involve all interdisciplinary teachers. Shanahan and Shanahan (2008) are more assertive about the need for direct instruction recognising that different texts, mathematics compared with history texts, for instance, require different strategies for reading and text construction. They are adamant that '…advanced literacy instruction embedded within content-area classes such as maths, science and social studies—should be the focus of middle and secondary school settings' (p.40). Furthermore, they assert that, 'Most students need explicit teaching of sophisticated genres, specialized language conventions, disciplinary norms of precision and accuracy, and higher-level interpretive processes' (p.43). Shanahan and Shanahan refer to this as 'disciplinary literacy' opposed to the 'intermediate' or general literacy 'common to many tasks' (p.44). While the interviewees seemed to be more focussed on 'intermediate' literacy skills in their criticisms, the conclusions by the majority that basic language skills should not be assumed as having already been acquired by Year 10 and should be addressed is not without support from teachers and academia.

5.4.3 The skill-base of teachers to assist students with the conventions

Almost all interviewees referred to particular teachers who impacted on them and they were able to cite examples of ways in which they were influenced and given recognition. This was true across all components of the Central Studies programs and included a range of English teachers (unnamed here). This observation by interviewees was consistent with views expressed by Rogers and Freiberg (1994) that students wanted teachers to be 'helpers'; that in an active classroom students should be seen as 'shareholders'; that there should be 'shared responsibility', with teachers taking on a the role of

a learning 'facilitator' rather than the teacher as the 'possessor of knowledge, and 'power'. Andrew Metcalfe and Anne Game (2006) in *Teachers who change lives* interviewed twelve prominent Australians and their teachers about what teachers do to change people 'so that we become ourselves'. The graduate students interviewed in this case study referred to passion and expertise in their field as two significant attributes recognised in memorable and influential teachers. However, in the spirit of the ASMS as a learning community and of the synergy between students and teachers in the learning process, they were in keeping with Metcalfe and Game's conclusion that 'the vitality of a classroom is an energy that teachers and students produce together' (Preface). Additionally, Metcalfe & Game acknowledge the 'dialogue' and openness between teacher and students and the ability and importance of the teacher creating 'the situation where learning happens'. These are attributes and conditions fully acknowledged and appreciated by the interviewees as significant elements associated with the ASMS that contributed to their growth as learners and for life beyond school.

Inspite of the positive view about teachers, there were considerations relating to the skill and experience of the teachers involved in teaching English. Michelle observed that because English was embedded in the interdisciplinary program, not all teachers teaching across the disciplines were experienced or skilled English teachers. Consequently, there were discrepancies in how errors were picked up or the degree to which teachers might make suggestions to facilitate more effective language use. For these graduates, this was clearly a significant area that needed greater focus in the development and execution of the curriculum. Coupled to this was a view that students who lacked essential skills or who lacked a 'passion for English' could have benefitted from 'more leading.' However, Julianne moderated this by recognising that '…because the [English] subject matter related back to things [scientific matter] that they were passionate about, it was really well-compensated for'. It must be noted, however, that reports by Davis and O'Reilly (2012) indicate a significant focus

directed towards the development of literacy skills amongst science and mathematics teachers to encourage a more shared responsibility to enable all teachers to provide greater support to developing students' literacy skills.

5.4.4 Assessment of group work and oral presentations

The facility with oral language was extolled as a positive outcome of the ASMS experience for all of the interviewees. This was something strongly acknowledged as providing a crucial skill for a range of purposes and situations in post-school study, work and personal life (see Section 5.5). However, Maddie was one interviewee who observed that in relation to English communication skills, 'there wasn't enough feedback on communicating well', partly because 'the learning outcomes were directed towards the content and not necessarily the method'. The opportunity to work in groups and develop collegial skills was strongly endorsed. However, several interviewees were critical of the way that the assessment of group work occurred, not only in relation to the English components of the Central Studies, but overall. Jeffrey recalled the inequity associated with the recognition of the contribution of individuals in a group. He drew attention to peer assessment processes used at university but also acknowledged the deficiencies with peer assessment at university as he experienced it in that members could collude to ensure a high mark. Abiz agreed that peer assessment 'had its own set of problems'. He suggested that there needed to be a balance between a collective and an individual assessment for group work. Julianne referred specifically to examples where she, or other more competent or academically inclined students, did much more of the work in order to pull 'other students up...' The positive side of this was the important roles assumed by influential student mentors. Nevertheless, although the assessment of group work generally was seen as problematic, and in need of review, Abiz was the only interviewee to suggest an alternative involving a balance of an individual and a collective assessment.

5.5 The impact of English in the Central Studies program as a preparation for further study or work

Only one of the interviewees did not go on to study at university, although he has since completed some post-secondary diploma courses, particularly in business management. Two of the interviewees completed degrees that did not have a relationship with science, mathematics or technology. The remainder completed science-related technology studies. All made references to the benefits they accrued from studying at the ASMS impacting on their post-school studies, work and for life in general. It was difficult for most of the graduates interviewed to separate the impact of English studies for future use from the overall long-term benefits of studying an interdisciplinary program in which English was embedded. Most interviewees were content to generalise about the skills they carried over from the Central Studies programs to their post-school lives. However, specific references to the English aspects of the programs were indicative of a relatively successful integration. This was supported also through an examination of both the curriculum initiatives and English tasks embedded in the Central Studies programmes, as well as the wider learning principles and capabilities fundamental to the ASMS vision.

In some fields of tertiary study, the general knowledge acquired through the Central Studies programs, or experience with concepts which superficially may have been seen as lacking relevance to that study, was enabling. Julianne, for instance, did not engage in tertiary study in a discipline relating to science or technology. However, she acknowledged that in her field of business and law, particularly in law, an awareness of such matters as cloning and nanotechnology was a benefit, since it provided a window into issues affecting social change and the way laws may need to adapt. It was this experience with science that was most useful for Rosie in transitioning from media into journalism. In contrast, she felt that some of her enjoyment of English was lost at the ASMS and that there was a deficit in terms of teaching the conventions—something that was an issue throughout her

schooling not just at the ASMS. Nevertheless, she conceded that the ASMS provided valuable curriculum learning opportunities and greatly influenced the person she became, 'to be more open-minded about things'. Jeffrey drew attention to the relevance of understanding ethical issues through his studies of English, particularly in the film *Gattaca*, and how this applies in his world of work as a mining engineer. He commented on the importance of being able to 'consider and weigh up what the risks are and what the impacts might be' and how 'that definitely carried over, especially into work now...', because mining is so closely tied to a variety of stakeholders, and the environment. He elaborated that there were conscious ethical considerations 'because you have a licence to operate' and there are conditions that need to be met. This appreciation of ethical issues was also considered by Andy. He said, 'There're lots of places in English where you can explore different ethical norms.' He referred specifically to considerations of ethical issues relating to biotechnology, nanotechnology, cloning and DNA manipulation. He concluded that while studying Physics, Chemistry and Biology may provide facts, studying issues through English allowed students 'to start looking at the ethical dilemmas you might come across in the future if this technology comes to fruition'.

The demand for independence, personal responsibility and resourcefulness in their learning were attributes recognised and valued by the interviewees. The opportunity to set their own goals, structure their own learning and set personal time limits was important to Julianne. She appreciated not being 'spoon fed.' When she went on to university studies she was surprised to find other students struggling, but her transition to tertiary studies was much easier because she was 'used to searching out new information and how to reference it'. Abiz commented on the apparent lack of direction at the ASMS, though not necessarily as a negative implication, and spent considerable time recalling that many students, including himself, wondered about the relevance of much that they were asked to do, including in English. However, he said that he only appreciated in retrospect that the approach that fostered personal responsibility and

independence, even in the English components of the Central Studies programs, provided valuable management tools beyond school. Jeffrey also appreciated the link between having the opportunity to make choices and the contribution to taking responsibility for his own learning. A consequence was that there needed to be a consideration of a variety of sources and this meant collating 'key' ideas across a range of texts. This connection was explored more deeply by Jack who asserted that the expectation that a student take personal responsibility for his or her learning was important in developing skills in 'self-direction', 'motivation' and 'time management'. These skills he argued are essential in the corporate world. He related this to his current work and role as an employer: '…being able to self-direct, that motivation, being able to do your own thing without being told what to do'. This quality is something that he looked for and believed was significant in an employee or a potential employee.

Several interviewees referred specifically to the inquiry processes, which Jack referred to as learning through 'investigation', as fundamental to curriculum delivery in the Central Studies programs in that they engendered important skills for further study. Julianne commented that what she valued most was what she learnt about critical thinking and she assessed this as the most useful aspect that carried over into her university studies. The experience and practice in applying analytical processes and engaging in the deconstruction of texts was particularly important for Jeffrey. He emphasised this, referring specifically to '…that ability to break down ideas and analyse them and express yourself in a clear and precise way—especially in the written form—and that has carried on through uni and even work now'. Others inferred similar views, particularly with reference to the Fertile Question which was cardinal to each Central Study.

While there was little specific reference to the more English-oriented tasks in the Central Studies programs, there were acknowledgements of various tools or skills learnt through English and other aspects of the Central Studies programs. Jack, for instance, referred to the use of

Excel spreadsheets, which he learnt to use at the ASMS but which are fundamental to his day-to-day work. Abiz also commented on the 'IT friendly' nature of the ASMS and that the relatively open-ended choices enabled them to present responses in other than conventional written formats. He valued this because it advanced skills in communication, particularly the ability to communicate in a variety of different mediums—something he only appreciated post-school. Julianne concurred with Abiz about the development of a facility with different forms or genres. She commented on the '…different ways that you could use English e.g. the recount, the report, the essay, the story writing…and the website development and the website evaluation…knowing about these things certainly made a difference'.

The development of oral language skills was referred to by most interviewees, who saw this as an area that was fostered through the way the curriculum was designed. Jack valued his experience with oral language, a significant aspect of both the English component of the Central Studies but across the range of topics. The frequency and practice, he said, '…improved my skills as a public speaker'. He related this to his current work and exemplified its importance by reference to selling a contract. He commented that it was not what was written in the contract that was important but what he 'could articulate that was persuasive'. Jeffrey also linked his developing proficiency with oral language at the ASMS as significantly important in his current work, particularly in working collaboratively. Maddie commented that she had 'never been a very good verbal communicator', that she lacked 'linguistic style' so that presentations were 'stressful'. However, because she got 'immediate feedback' and helpful suggestions from her peers facilitated by the tasks and pedagogies associated with each of the Central Studies, and because of the supportive ASMS environment, she became more confident. Andy also recognised how his oral abilities developed and how as a result of support and because of the regular practice he became 'a lot better at explaining things to people'. Now, he uses a more internally dialogical approach, a very Bakhtinian notion (Bakhtin, 1981), thinking

more about the questions that people might want answered first, then considering how he might structure the information or explanations that he needs to provide.

The opportunity for collaboration and to work in teams was highlighted as contributing to skills that impacted on both post-school study and work. Jeffrey recalled the World Summit from the Sustainable Futures Central Study and isolated skills involved in planning, coordinating ideas, working in a small team, organising weekly meetings, assigning responsibilities, delegating tasks, working out goals, that is, 'what we wanted to achieve', as important in developing his abilities to work with others. He provided a current example where he was working with two engineers and asserted that small group dynamics are 'incredibly prevalent in industry' and that the skills and experiences that were developed at the ASMS had been significant.

Maddie also felt that 'collaboration' or 'working in groups' was an important facet of the Central Studies and that the processes of working with others, sharing thoughts about a problem, discussing and negotiating were beneficial. However, she recognised a disjunction between the ASMS experience and post-school study in that she had little opportunity to engage that way in university life. She reminisced about this aspect commenting that frequently it was so collaborative at the ASMS that often no one could remember who came up with an idea in the first place. She referred to the process as 'group-thought mentality'.

The impact of experiences engendered in the tasks, the processes of inquiry, the opportunities for collaboration and the development of communication skills extended beyond post-school study and work but also applied more broadly to life skills. For most interviewees, like Abiz, it was the 'sense of community' that led to a modification of life views. He said that the interdisciplinary approach helped him with his general thinking and challenged a more 'rounded approach to understanding life'. He provided a view that through aspects of his studies of English he developed a greater understanding about cultural

and philosophical ideas. He provided an extended illustration in relation to health sciences or medical fields of how this sense of community applied in a humanitarian way in his life beyond school:

> ….in my degree, especially, we do have a lot more coverage about things relating to ethics, and philosophy, so in the biological sciences and the health sciences or the medicine fields, we can relate it not just to the core scientific method but, 'Here's some observation, here's what we know best from that observation and this is how the hypothesis holds up.' We can also consider that in a different mindset, so, what does this mean in terms of a person or a family or a community and what does it mean in terms of your responsibility as a practitioner or as a citizen of some sort? So, I would say it is useful if you can consider different approaches in a scientific field. (Abiz)

Jack also acknowledged that the skills and attitudes developed at the ASMS have been applied in all aspects of his life and work every day. He argued that the sense of a learning community required interactions that helped him and others deal with people in a way that enabled one 'to survive in the real world'. He further generalised that the requirements for self-direction and time management as engendered through the Central Studies programs had applications to relationships, work ethic, housing, and friends. He concluded that people need to be 'self-directed in life'. Abiz applied this to problem-solving and 'other areas of metacognition'. All of the interviewees acknowledged the importance of communication summarised by Maddie's insight about 'how much communication can make a difference'.

5.6 Associated findings not central to this study but with relevance to the ASMS leadership team

Four issues that arose consistently during the interviews and deemed to be of interest to the ASMS leadership team have been detailed in a separate report which has been sent to the ASMS Principal for

consideration by the leadership team and staff. In summary, these included:

- the reasons why the graduates chose to attend the ASMS

- the importance of the teacher or tutor as a mentor and model for interdisciplinary practice

- comparisons between the MAT (Mathematics) Central Study and the more science focused Central Studies, particularly in relation to the attention paid to basic disciplinary skills and concepts

- the impact of the change to the opportunities to choose to complete SACE units in earlier years after the introduction of the 'new' SACE requirements in 2010.

Additionally, all graduate students commented on the significance of the architectural design of the building, particularly with regard to the flexible and open learning areas, easy access to staff, availability of high quality and flexible IT tools and the proximity to shared tertiary resources. They regarded the design as having made a significant contribution to their learning both socially and academically because the architecture promoted the opportunity to develop a genuine sense of a learning community.

CHAPTER 6: CONCLUSIONS

Following is a discussion with reference to the overall analysis of the narratives evolving from the interviews and a linking commentary to the ASMS goals, adopted learning theories, curriculum statements and exemplars from the two year interdisciplinary cycle. The discussion also acknowledges the changing nature of English both as a school subject and as a discipline in its own right which has a consequent impact on how English might be viewed in an interdisciplinary approach in the future.

6.1 Introductory comments

The dialogue that ensued between participants and the researcher in the hour long interviews was relatively organic so that, as observed by Connelly and Clandinin (1990), the evolving narratives between the interviewees and the researcher became 'a shared narrative construction and reconstruction through inquiry' (p.5). In the process of analysis and reconstruction, however, care has been taken to avoid what Connelly and Clandinin (1990) have referred to as 'the Hollywood Plot' (p.10); that is, contriving to shape the data towards a happy ending or softening possible negative interpretations. This researcher was cognizant of the need for 'reflexive self-awareness' (Someck and Lewin, 2005, p.4) to minimise interpretative bias. This was particularly important given the interviewer's association with the ASMS prior to the research being undertaken

While the place of English within the Central Studies was the focus in this case study, the very nature of the interdisciplinary program deliberately facilitated by the architectural design of the school, the integrated structure and content of the curriculum, and the espoused goals expressed in the ASMS Charter, including those invested in the Graduate Capabilities, made it difficult to isolate a singularity defining the place of English. The difficulty in maintaining a focus on the place of English as a discrete area of study was exacerbated by the interviewees' strong identification with the overarching

interdisciplinarity, including the place of inquiry, their appreciation of the common assessment procedures, the nature of shared resources (especially access to Flinders University), and the ASMS as a collegial learning community. That the interviewees consistently focused their recollections around the sciences, and to a lesser degree mathematics, was not surprising since the ASMS Charter asserts that its goal is to respond 'to current and future interests and needs of its students to establish models of excellence in science and mathematics education' and to provide 'a learning environment of leading edge and enterprise-oriented science, mathematics and technology' (ASMS Context Statement, 2011, p.3). Consequently, many of the observations made by the interviewees related to the interdisciplinary curriculum and their evaluation of the ASMS as a successful learning institution that has impacted positively on their post-school lives.

6.2 Curriculum design with reference to the place of English in an interdisciplinary program and delivery in practice

Against the flux of debate about the changing nature of English as a school subject, impacted by socio-cultural changes significantly in relation to communication and work, and by politically motivated imperatives regarding numeracy and literacy standards, must evolve a valuation of how effectively a school's curriculum design or construction delivers the skills and tools needed for post-school work, study, or general living. At a curriculum design level, teacher planners developing the Central Studies programs at the ASMS were cognisant of a range of links that informed their practice and needed to be considered in shaping what was required but also melded with the broader interdisciplinary goals. The diagram (Appendix 4) provides an overview of issues, including theoretical understandings, curriculum components, pedagogical considerations and common interdisciplinary links, relevant to the English component of the interdisciplinary Central Studies programs. At a systemic level, the ASMS was required to meet the Stage 1 accreditation requirements of

the South Australian Certificate of Education (SACE) through the interdisciplinary programs. Consequently, in each semester students had to meet the following minimum requirements for completion in English:

- two text responses

- two text productions

- one oral presentation

- and, either, a connected text study in one semester

  or, a critical literacy study in the second semester

The responsibility for ensuring that these requirements were met lay with the teachers responsible for English when working collaboratively with specialist teachers in other disciplines to design the focus, central fertile question and embedded tasks in each Central Study. How the key requirements were met through the task choices was more open-ended and, as acknowledged by the interviewees, there was considerable opportunity to choose from a range of possibilities, negotiate modes of response, collaborate, use scaffolding, benefit from peer feedback and self-evaluation, and engage in genuine, authentic and meaningful problem-solving or tasks.

This case study was not intended as a mapping of the curriculum to inform the present through 'historical retrospectivity' (Cormack, Grant, Kerin, and Green, 2003, p.67). However, a central goal was to develop a commentary around the impact of integrating studies of English into essentially science-focussed interdisciplinary studies and gauging the impact of this on students in whatever further study or post-school situation they entered. In order to appreciate this, it was pertinent to measure the interviewees' observations alongside examples of planning processes, curriculum materials and student responses. The following discussion is based around a selection of materials which have more English-oriented focuses but are clearly intended as interdisciplinary in their application. Archival materials were mostly held on an electronic Learning Management System which has

undergone a number of transformations over the years. However, several examples of tasks and teacher advice notes (Appendix 5) have been recovered and provide an illustration of curriculum design, attention to balance and interrelatedness, and facilitation of systemic requirements (Appendix 6).

In the Biodiversity Central Study one significant task was a Creative Diversity activity which involved a study of poetry and the creation of two 'poetry bricks' of words and images for display on a poetry wall (Appendix 2a). The task encouraged group sharing and had an element of peer assessment with a rubric to facilitate this. Additionally, there was a general rubric designed to meet the SACE text production requirements and which was adapted for non-SACE and ESL assessment purposes. Students were required to keep a Learning Log as a self-monitoring device to assist them in maintaining a progressive timeline for completion and as a tool for self-reflection. Additionally, the Learning Log was designed as a tool to provide a log of thoughts and ideas that might ultimately contribute to the planning associated with the completion of the Fertile Question. The Learning Context advice statement for the task highlighted a focus on communication and an understanding of the difference between denotative and connotative language. Guidelines for examining the differences in the use of connotative and denotative language in scientific writing and more artistic texts were included in the Learning Log materials (Appendix 2b). An example of one student's responses and rationale are included in Appendix 2c. Although most of the interviewees did not recall much about the study of poetry, poetry texts were central in the Biodiversity, Sustainable Futures and Variety of Life Central Studies as text responses or creative writing tasks. Importantly, however, commentary about the value of group work, peer assessment, developing self-discipline and reflective practices were highly esteemed through these and other tasks.

Text response studies, other than poetry texts, were incorporated into the Biotechnology, Body in Question, Earth and Cosmos, and

Technological World Central Studies. These included the study of film, *Inherit the Wind* and later *Gattaca* in Biotechnology, novels (self-selected in Body in Question and excerpts in others) and short stories in Earth and Cosmos. While most of the interviewees did not feel they had 'missed out on anything' as a preparation for Stage 2 English Studies or Stage 2 English Communications (if they chose to go on) they were guardedly critical of the lack of practice in critical analysis. However, examination of the lesson sequence in the teacher notes for the study of the film *Inherit the Wind* shows a clear intention to examine the structure of a film text and to highlight issues in relation to 'point of view'. While the content focus was on 'using a media text to examine conflict between scientific beliefs and traditional, moral or spiritual beliefs' (Teacher Notes)—an interdisciplinary intention—the sequence of lessons employed illustrated instruction in film language, a story board activity to illustrate 'plot development and sequencing', an analogous role play to introduce 'point of view' and shared class discussion to develop skills in critical analysis before the completion of the set task. The rubric clearly delineates an emphasis on understanding literary and film techniques, genre (form) and language (register).

In the Body in Question Central Study, there was a similar targeting of literary analysis. Students were divided into one of three areas relating to health; immunology, physiological health or mental health, and with the support of the librarian were assisted in choosing from a range of relevant texts pertinent to their allocated area and then worked in reading groups of three to collectively explore these texts. (See Appendix 7 for introduction to task). The task sheets provided a range of possible response modes but clearly emphasised attention to the conventions of literary analysis: recognition of themes and pertinence to the contemporary world, the understanding of the relevance of the ideas to important life issues (in this case one of the three strands relating to human health), stylistic features, and an overall critical assessment (in the form of a recommendation.) The Connected Text Study and the Short Story Unit in the Earth and Cosmos Central Study

and the study of either Shakespeare's *Macbeth* or picture books provided further opportunities for students to engage with texts, to explore structure, language, purpose and audience in addition to relevant social issues relating to social living, philosophical questions, scientific understandings and communication.

Based on this brief examination of Central Studies materials, a more extensive analysis of lesson notes, learning materials and advice, teacher notes, rubrics and other curriculum documentation suggests that there was ample opportunity for students to engage with a diversity of texts and to develop appropriate skills in critical analysis. Thus, the assertions by the majority of interviewees that they had not 'missed out on anything' as a preparation for further study seems a fair assessment in spite of the fact that many felt a lack of preparation in literary analysis.

Interviewees were very positive about the opportunities to develop their oral communication skills. Examination of task sheets and rubrics show a strong emphasis on group collaboration and oral presentation. The interviewees recognised the importance of clear and appropriate communication skills and this was paramount in activities such as The Earth Summit in the Sustainable Futures Central Study and the Nano Fair in the Towards Nanotechnology Central Study. Other opportunities were prevalent in the choices students made in response to Fertile Questions. For the Communications Systems Fertile Question students enjoyed a large range of choices including comic or cartoon strips, imaginary transcripts, memoirs, poetry, taped or filmed interviews, or another negotiated form in response to the question, 'Are we the controllers or the controlled?' Indeed, the final advice was, 'It is up to you to choose how you respond to the ideas from the teaching units.' Interviewees valued the licence to choose and negotiate and many acknowledged that this enhanced their learning because it enabled them to 'play to their strengths'. Several interviewees confessed that they were initially very uncomfortable with oral presentations but indicated considerable gratitude in having been

supported in a positive learning environment to develop their confidence and oral skills through group activities and delivering 'publicly' either individually or in team situations.

Although interviewees were critical of the lack of attention to teaching the conventions of written English, examples of tasks relating to text analysis already highlighted show a considerable emphasis on examining how language works in a range of texts, including scientific, technological, filmic, iconic, and creative texts more pertinent to the arts and humanities. The analysis and construction of scientific texts and reports involved understanding the nature of denotative language. The language of reporting and persuasion was central to the 'Town Meeting' task in the Towards Nanotechnology Central Study. Specialist critical language for literary analysis for narrative, drama and poetry texts and the requirements for more formal essays were evident in Biotechnology, Body in Question, Earth and Cosmos, and Sustainable Futures Central Studies tasks. A particular focus on connotative language was also evidenced in a range of tasks, particularly relating to more English-oriented activities. However, most interviewees did not recall this as an overt focus on, or teaching of, the fundamental conventions of written language use. Many felt that there were gaps in their knowledge about these functional areas from earlier schooling experiences. There was a strong feeling that these should have been more strongly targeted and in some cases specifically remediated.

To facilitate efficient and effective language skills, most interviewees were adamant that they preferred teachers who were enthusiastic and dedicated English teachers with the knowledge and skills to foster excellence in language use—a view paralleled more widely by many prominent citizens in reminiscences about teachers who made a difference to them both as students and into their post-school careers and lives (Metcalfe and Game, 2006).

6.3 Commentary

The place of the arts or humanities is not specifically mentioned in the ASMS Charter, but the expressed intention to 'prepare young people to be creative, critical, informed and motivated contributors responding to professional, personal and social issues' (ASMS Context Statement, 2011, p.3) goes somewhere towards embracing and legitimising the integration of disciplines beyond mathematics and science. The first and second Graduate Capabilities which the ASMS expected students should aspire to and be competent in relate to being able to operate 'scientifically' and 'mathematically'. The remaining four are more general with applications across the disciplines. Many of the interviewees singled out as an English outcome the development of their personal and professional abilities in communication, whether completing oral presentations, discussing issues in groups or planning collaborative presentations, or writing appropriate forms for a particular purpose: for example, a science report, a narrative, an argument etc., or a text using multi-media resources. However, the application was interdisciplinary in practice. Being able to 'communicate effectively' implies the clear, precise and measured expression of ideas and learning using a variety of forms and genres. Though oral, written, and forms employing information technology resources were evidenced in all aspects of the interdisciplinary program, they were key communication modes in the SACE English curriculum. At the ASMS, the interviewees recognised that the achievement of effective communication skills was facilitated by an interest in the content of the interdisciplinary programs and the ambience of a learning community that supported the development of communication skills in a non-threatening environment.

The sixth Graduate Capability relates to the demonstration of 'critical literacy skills' and like the Communication Capability has an interdisciplinary application both for dealing with learning within school and aspirations beyond school. The problem with the reference to 'critical literacy' in the Graduate Capabilities is that it is not defined.

Many of the interviewees commented on their growth in their abilities to probe texts more deeply, to deconstruct texts and to analyse them more critically, but critical literacy is more than examining the detail or breaking a text into discrete components. Critical literacy involves students critiquing texts in ways that challenge them to understand the socially constructed beliefs, values and attitudes inherent in them. It involves students developing an understanding of discriminatory practices, of power differentials and inequalities associated with social justice and status, and of how readers are positioned by authors for particular purposes (Harste, 2003; Shor, 1999; Tompkins, 2010; also, Friere, 1970; and, Shor and Friere, 1987). This goes far beyond conventional understandings of literary analysis or the *instrumental* or *functional* literacy that students need to access a variety of twenty-first century texts.

In the context of the interdisciplinary curriculum, critical literacy in science hinged around philosophical issues relating to ethical considerations. An example elaborated earlier related to aspects of nanotechnology and the social, ethical and economic considerations around the building of a nano factory in a sensitive location. A second related to understanding the impacts of climate change through presentations at a simulated world forum in the Sustainable Futures Central Study. Another related to ethical considerations around the manipulation of DNA in the Biotechnology Central Study. While students expanded their considerations of these issues into science areas, much of the stimulation arousing such connections came through the study of literary texts, for example, excerpts from Michael Crichton's *Prey*, the study of the film *Gattaca*, examination of views expressed through poetry, and the study of historical documentaries such as *Brooklyn Bridge.*

The cross-over between the disciplines and the way this influenced curiosity, the consideration of problems and the acquisition of knowledge, was recognised by all interviewees. Aspects of critical literacy were stimulated through particular texts and curriculum content

but in a 2010 report, *Scientific Literacy & the ASMS* (Davis and O'Reilly, 2010), there is an indication that teachers were grappling with the distinction between 'scientific literacy' and 'critical literacy'. In considering the role of the science teacher in assisting students with written texts, the writers concluded that both the English teacher and the science teacher had a collegial responsibility to assist students with conventions such as spelling, punctuation and grammar as well as the structuring of texts, but they left an unanswered question. They postulated that, 'There is a growing depth of understanding of the concept and an understanding about applications' but then posed the question, 'Is this Scientific Literacy or simply Critical Literacy?' (p.8). The graduate students were able to demonstrate an appreciation of the impact of 'critical literacy' to some degree. What seem to be less explicitly acknowledged and need to be more consciously considered by the curriculum designers, are the literacy differences that enable a student of history to think and communicate like an historian or a student of science to communicate like a scientist, for instance. Shanahan and Shanahan (2008) summarise the point: '…there are differences in how the disciplines create, disseminate, and evaluate knowledge, and these differences are instantiated in their use of language' (p.48).

Two related learning principles elaborated in the ASMS Charter (2011) relate to 'inquiry learning' and accessing 'authentic experience'— 'allowing students to study real world ideas, problems and issues and to make connections with their learning that are meaningful to them in their present and possible future life circumstances'(p.4). To facilitate learning through inquiry and authentic experience necessitates what Gardner (2006) referred to as 'multiple entry points' (p.138), opportunities for negotiation (Boomer, 1992) and choice. Interviewees acknowledged the significance of choice, particularly in responding to tasks that were more conspicuously related to what they regarded as conventional English-type tasks. Gardner (2006) saw this as critical in the creation of the 'expert' which he defined as 'an individual who can think about his or her area of expertise in multiple ways—verbal

description, graphic sketches, behavioural embodiment, humorous renditions, and so on' (p.142). The examination of the ASMS Central Studies programs presented 'multiple entry points' that provided access to the exploration of ideas, the construction of knowledge and the presentation of understandings through a broad range of modes— narrational (narrative or story); logical (structural/scientific argument); quantitative (numerical/statistical relationships; foundational/existential (philosophical aspects); aesthetic (artistic/sensory); experiential (hands on/authentic experience/practical); and, 'collaborative' (group work/peer supported) (Gardner, 2006, pp.139–141). The Fertile Question was a particularly enabling key in each Central Study to provide the opportunity for students to approach an investigation around their 'take' on an issue or problem and the interviewees described different ways of reporting their findings or conclusions, including writing poetry or narratives. Understandably, because of the focus on mathematics and science at the school, the majority of presentations relied on the logical and quantitative, and evolved through collaboration. Nevertheless, choices enabled students to develop self-discipline, take responsibility for their own learning and become the agency for personalisation (Cliff and Miller, 1997). As demonstrated through the responses of the interviewees, choice, particularly in relation to the examination and construction of more literary style texts, enhanced their pleasure or enjoyment and provided a significant springboard for growth as communicators.

While the interviewees were critical of the lack of attention to teaching the conventions of English and of ways to critically analyse a text in preparation for Year 12 English studies, they saw the skills developed and alternative ways of perceiving the world as valuable in their lives beyond school. They highlighted the development of oral skills and distinguished the differences between working formally in collegial problem-solving and team-building, the ability to communicate using the richness of IT resources, and the understanding of a range of different forms and genres (and the structural and linguistic features that hallmarked these for particular purposes and audiences) as

important. The diversity of choice also exemplified an underlying principle of constructivist learning, of fostering curiosity and of inquiry processes (Piaget, 1973; Dewey, 1933; Harpaz, 2003; Harvard Project Zero, Harvard University, 2002).

6.4 Summary: What was valued?

Hargreaves and Fullan (1998) challenged schools and teachers to consider 'what's worth fighting for'. Much of this focus was on community building, creating civic and democratic awareness. They called on schools to build 'democratic communities which value participation, equality, inclusiveness and social justice, in addition to loyalty and service among all their members' (p.13). Like Gardner (1993), they also highlighted the need to foster a 'knowledge building society' (p.47) and cultivate 'emotional intelligence' (p.32). In practice, a successful interdisciplinary approach demands: a flexible and innovative role for the teacher; a curriculum that acknowledges the key disciplinary intelligences and basic concepts on which disciplinary approaches have been modelled; tasks that allow students the freedom to explore and present their findings in a variety of ways; and an assessment process that enables self-reflection, presents clear and achievable assessment criteria, and acknowledges the components of an interdisciplinary program and contributes to meaningful learning. It is clear from the interviews of the selected graduates that they saw the ASMS as a community of learners, supported by passionate and dedicated teachers, who fostered collaboration, facilitated the sharing of resources, and constructed challenging and authentic tasks which were enhanced by interdisciplinary thinking and led to personal growth and opportunities for excellence in achieving learning goals and outcomes.

The interviewees concluded that at the ASMS, creativity, invention, and the use of imagination was encouraged by allowing alternative ways to present the outcomes of an inquiry. Hence, students were enabled to demonstrate their understanding of fundamental academic subject knowledge and ways of applying that knowledge to solving

real-life problems. In the process, they developed tools for future study, work or engagement in the world as responsible global citizens. This included the acquisition of higher order thinking and literacy skills that were empowering in their post-school academic pursuits and enabled adaptability in the world of work. Central to an interdisciplinary approach designed to build bridges across the disciplines and enhance problem-solving skills was the development of tasks that encouraged questioning, cross-discipline subject connections, the abstraction of theories and ideas, and the development of interpreting and analysing skills. It also encouraged the conceptualisation of ideas, the use of evidence and reasoning, and the acquisition and application of content knowledge.

Learning and inquiry opportunities were enhanced by opportunities to work with mentors from the university and the University Studies program current at the time. Many availed themselves of the chance to participate in International Science Fairs or student conferences overseas—opportunities that most felt would not have been available through more conventional schools. Thus, curriculum was seen to be much broader than one limited to a local school site or mandated by an assessment authority. The experiences gained from participation in these related extra-curricular events contributed significantly to each interviewee's life experience, knowledge and sense of self. It fostered a sense of team work, responsibility, self-sufficiency and purpose for learning. It also fostered development in their communication skills and provided opportunities for them to present their knowledge and understanding to real audiences, something which each interviewee acknowledged carrying into life beyond school. For these graduates, meeting the ASMS Graduate Capabilities was not a segregated goal but was achieved seamlessly because they were so intimately encapsulated in the curriculum design, tasks and opportunities to parade or champion their learning. While there are challenges to confront in assimilating the changing nature of English as part of the interdisciplinary program at the ASMS, the existing Central Studies provide a substantial platform for creative integration.

Erica Jolly (2010) in her scholarly book *Challenging the Divide: Approaches to Science and Poetry*, deplored the teaching of separate subjects in schools because it mitigated against the fostering of 'curiosity', 'undermined the independent spirit of learning', and 'perpetuated tunnel vision' (p.1). As a visiting poet and passionate advocate of the importance of science, Jolly mentored ASMS students in responding to scientific understandings and challenges through poetry. Although none of the interviewees were at the ASMS for this program, several used poetry as a vehicle to respond to scientific concepts (Julianne and Michelle). However, Jolly took this a long step further, devoting a whole chapter reporting on the outcomes of the 'Poetry and Science at the Australian Science and Mathematics School Project.' Her conclusion is powerful:

> The students and staff of the Australian Science and Mathematics School have demonstrated what is possible. They have turned a dream of connections into a reality. Their work sheds new lights on what is possible where collaboration within and between schools is fostered. This school has been built on this connected approach, recognising the individual strength of their disciplines as well as ways they interact, into the hearts and minds of students. Nothing has been lost. Much has been gained (p.193).

This is what interdisciplinarity is centrally about and Jolly's comment summarises a significant achievement at the ASMS in materialising learning through an interdisciplinary approach and one in which the study of English has made an important contribution. That many of the graduates interviewed reported less than satisfactory experiences in their pre-ASMS English classes but were able to say that at the ASMS their enjoyment of English-type tasks as part of the Central Studies programs improved, sometimes beyond expectations, indicated a successful integration. Choice of texts and ways to respond to them, opportunities for peer-feedback and self-assessment, the relevance of the content to aspects of science or other issues that interested them, opportunities to be innovative, the emphasis on inquiry, leadership

possibilities in the wider school environment and the supportive learning community that fostered risk-taking contributed to their enjoyment and sense of achievement. The constructivist methodologies and the spirit of interdisciplinarity are evidently powerful tools to facilitate effective learning. Different ways of considering problems in later study and careers, the ability to work independently and collaboratively, confidence in communication, and the capacity for critical thinking and evaluation, were all outcomes that were taken into post-school situations. Stephen Lawrence, a local South Australian poet, in a short essay, *The Sounds of Silence* (in Jolly, 2010), predicted an outcome of integrated studies that provides a great deal of hope for the future, a potential that the graduates interviewed seem capable of materialising because of their learning experiences at the ASMS. Lawrence said:

> Science and art are our highest realities. If they can join and blend in creative ways, humanity has the chance of moving forward productively and avoiding catastrophe (p.202).

The brief stories based on reflective reminiscences shared in this case study already indicate significant contributions by the interviewees to community through their various career choices and interests, and are illustrative of the value of an interdisciplinary approach that blends English, the arts, and the humanities subjects in curriculums focussing on the sciences and mathematics.

Overall, the interviewees presented a relatively positive view about the place of English as delivered through the interdisciplinary Central Studies programs. The interdisciplinary approach at the ASMS enabled students to use literature, inquiry processes, text production and multi-media communication tools to draw on texts and ways of thinking in other fields to enhance their engagement with ideas, imaginative worlds and factual accounts in the construction of new texts and engagement in a rich array of metacognitive challenges. This involved deconstruction and analysis, the adaption of new ways of thinking, and the construction of new texts that embodied fresh

knowledge and understandings. They applauded the opportunity to make choices in terms of texts and ways of responding within the established guidelines. They valued the flexibility and a level of personalisation and independent learning through the programs. They acknowledged the development of skills, including oral skills, group work, the awareness of a range of genres, the function of language pertinent to audiences, purpose and function of particular text forms, and the value of accessing knowledge from different disciplines and sources. As a preparation for Year 12 and study or work beyond school, they were positive that they had been well-prepared and that many of the skills they had learnt were significant life-skills that made 'educated people out of educated students' (Jack). While they acknowledged the access to resources and the significance of the ASMS environment architecturally, they also saw the school as a learning community. The opportunity to engage in an interdisciplinary approach to learning and to have the opportunity to construct products for authentic purposes or in simulated situations mirroring real events was seen as particularly rewarding. All interviewees agreed that they were well served by the school experience.

Appropriately, the graduates should have the penultimate words. Michelle commented on the school as a learning institution:

> I feel very lucky that I had the opportunity to go to the ASMS and I look back fondly on my years there and I'd like to think that students in later years might feel that—because of the opportunities we had, and because of the teachers we had, as well as the fellow students in the kind of environment which facilitated the learning (Michelle).

Julianne and Rosie felt that the interdisciplinary approach had real positives. Jack referred to a 'well rounded education' and that he felt there was no other school in the state that could have 'prepared me for life as the ASMS did'. Julianne was more specific asserting that the integration of science within the Central Studies, and with particular reference to her love of English, has served her well because she is

more cognisant in her post-school life about issues that are present in the world. In her summary interview statement, she expressed something that could be attributed to all. She commented on her development as a thinker. She said, 'Because I was freed to connect everything, I ended up being a better thinker, a better problem solver…a better everything' (Julianne). And, Jeffrey ruminated more particularly on his successful engagement with English—a view echoed by most of the interviewees:

> I think that overall there was quite a good balance when I was there—like, we considered quite a range of texts, films, books, ah, fiction, non-fiction—pretty much everything and then there was also the basic skills like writing, using the correct language for reporting and things like that. Yeah! I think it was a really good spread…

> …I think the English component of my work at the ASMS has just been really good in forming skills going into university and beyond. I think that, to be honest, before that I didn't really enjoy English, it wasn't my, kind of, 'cup of tea'. But…having that integration and being able to apply it to different sorts of things, it really helped…Quite a lot, I think. (Jeffrey)

Although the graduate students from the ASMS did not have the academic descriptors to define their understandings about the nature of English, nor incidentally about other school subjects or academic disciplines, their collective recollections recognised many of the disciplinary issues highlighted in this study and the implications for them in their post-school study and their lives. Their responses also were extended to include considerations for future students: for example, understanding the purpose and function of different text forms, the appreciation of language pertinent to a particular discipline and audience, knowing how to critically analyse or deconstruct a text, the importance of clear and precise communication skills, the ability to choose from a range of different tools to present their ideas or conclusions, and the importance of collaboration. And, they saw these as significant for the successful completion of school and post-school

study, and for achieving useful life-skills. The flexibility or capacity of curriculum authorities and designers to adapt to contemporary societal expectations, both local and global, and to develop curriculum to evolve highly educated young people with exemplary communication skills, collegial capabilities, but also the ability to act independently, and with the capacity to think creatively, emerged as a significant imperative. As indicated by the recollections and stories of the graduates interviewed in this study, the ASMS appears to have effectively achieved this in accordance with its Charter, and the subject English as a component of the interdisciplinary approach has not only contributed to this outcome but has also benefitted the students in the process.

6.5 Broader implications and follow up

The ASMS has already begun the process of reviewing a number of areas referred to critically by the graduates. These include a focus on the conventions of language, the explicit teaching of forms and genres associated with particular disciplines and the reaffirmation of inquiry as a foundational theory for learning. These are being addressed as part of their ongoing reflective review of performance. The initiative for some of this has also been stimulated by the implementation of the requirements of the National Curriculum. Much, however, is associated with the culture of the site and its dedication to achieving excellence as espoused by its Charter.

At all levels of government, amongst business representatives and by some elements of the public, there has been, and still is, considerable contemporary concern about the achievements of students in relation to STEM (Science, Technology, Engineering and Mathematics) and criticism of teaching and learning in science and mathematics at both the school and tertiary sectors. However, there has also been an increasing focus on STEAM, (Science, Technology, Engineering, the Arts and Mathematics), as an integrated educational approach. The ASMS is a model that has many strong elements for consideration by educational leaders reviewing the needs for contemporary education.

A much more comprehensive study than was possible through this dissertation could be undertaken.

In the process of developing and completing this study, however, a variety of possibilites for further study evolved. As indicated earlier in the dissertation, a comparative study between more conventional and more innovative educational sites, the impact of different models of curriculum choice and delivery, public perceptions of schooling and the preparation of teachers to engage in interdisciplinary teaching were backgrounded but were beyond the scope of this study.

While this study has particular relevance for the ASMS, at a broader level, a consideration of the collaborative processes in which teachers at the ASMS engaged in designing curriculum and units of work to assimilate state and national requirements, and to meet the educational outcomes expressed in the ASMS Charter, could provide an instructive model for other work sites. An examination of how an interdisciplinary curriculum (including the arts, humanities and English along with STEM subjects) could contribute to the evolution of a rich learning environment that impacts positively on student learning outcomes and has the potential to contribute significantly to important skills for post-school study, work and life, would be worthwhile.

APPENDICES

Appendix 1: Australian Science and Mathematics School Context Statement – 2011 (Pages1-12)

Appendix 2a: Example of a task and rubric from the Biodiversity Central Study

Appendix 2b: Example of Learning Log Advice from the Biodiversity Central Study

Appendix 2c: Student sample of two created poetry bricks, samples from the learning log, the student reflection on the task and written rationale

Appendix 3: Task and rubric for the Fertile Question in Communication Systems Central Study

Appendix 4: Theoretical and pedagogical issues to be considered in the incorporation of subject English within an interdisciplinary curriculum

Appendix 5: Example of teacher notes from the Variety of Life Central Study

Appendix 6: Communication Systems Curriculum Statement – Visual Texts (English tasks)

Appendix 7: Introduction to Body in Question Text Response Unit

Appendix 8: Example of an interview transcript

Appendix 9: The unexpected extras with relevance to the ASMS leadership team

Appendix 1: Australian Science and Mathematics School Context Statement – 2011 (Pages1-12)
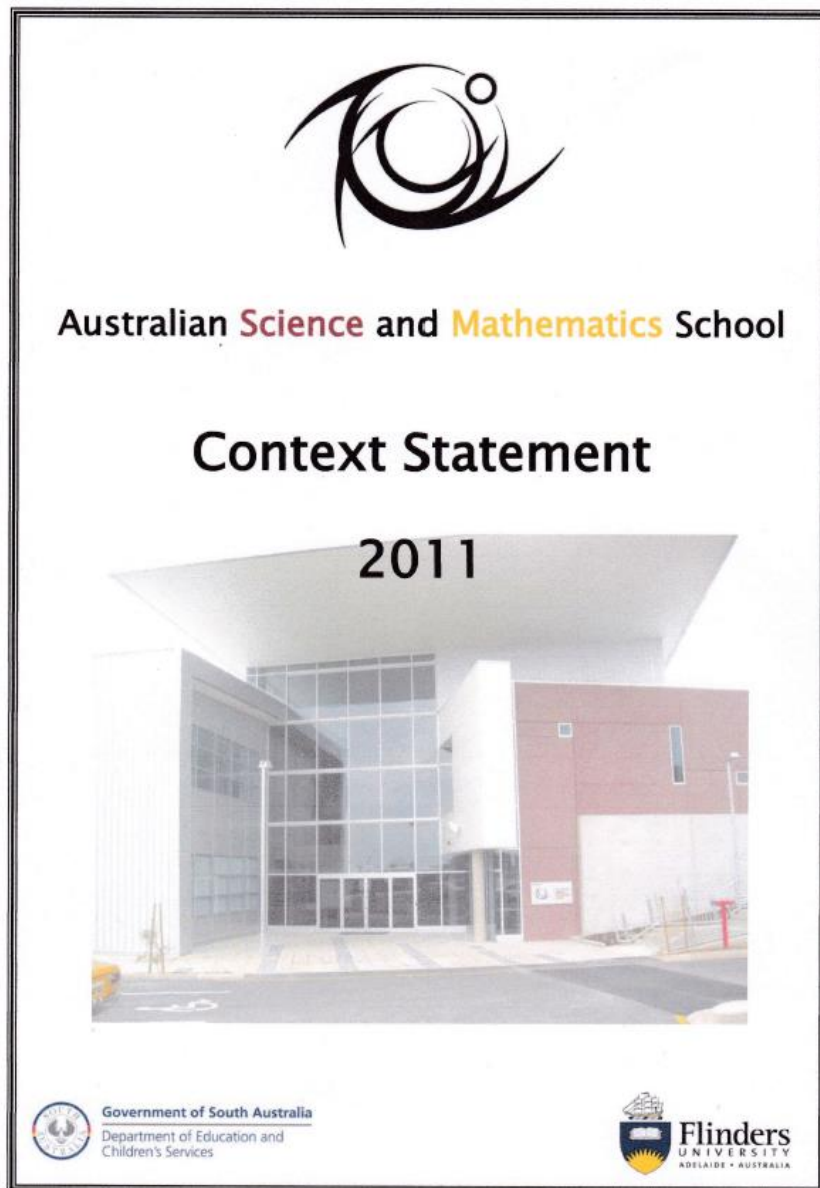
AUSTRALIAN SCIENCE AND MATHEMATICS SCHOOL

SCHOOL CONTEXT STATEMENT

School number: 1800

General Information

Principal: Susan Hyde

Deputy Principal: Graeme Oliver

School e-mail address
asms@flinders.edu.au

Staffing numbers
34.0 Teaching Staff
10.0 Support Staff

Enrolment trends
2004   265 students (years 10, 11, 12)
2005   274 students with up to 30 of these being international students (years 10, 11, 12)
2006   250 students with up to 30 of these being international students (years 10, 11, 12)
2007   260 students with up to 30 of these being international students (years 10, 11, 12)
2008   265 students with up to 30 of these being international students (years 10, 11, 12)
2009   291 students with up to 30 of these being international students (years 10, 11, 12)
2010   336 students with up to 30 of these being international students (years 10, 11, 12)
2011   336 students with up to 30 of these being international students (years 10, 11, 12)

Year of opening
2003

Public transport access
The ASMS is located on the grounds of the Flinders University of South Australia. It is serviced by the same network of public transport that supports the university, including a bus service connecting different sections of the campus. The Tonsley railway station is approximately 1km northwest from the school.

Students (and their welfare)

General Characteristics

The Australian Science and Mathematics School (ASMS) draws students from metropolitan and rural areas in South Australia, and from interstate and overseas. This diversity reflects the global community in which students will work when they graduate.

The school has a social as well as an academic heart. It provides a number of points within the building to give students an all important sense of having a 'home' base.

The school learning community is based on strong and trusting relationships with peers, teachers and other adults

Each student has a tutor who is an advocate, counsellor and mentor

Each student has a personal learning plan that is regularly monitored and updated in collaboration with the tutor.

Tutor Group Program

Each student at the ASMS is a member of a Tutor Group. The Tutor Group aims to:

➤ provide for a positive and meaningful adult-student relationship
➤ be a source of advocacy for each student
➤ develop Personalised Learning Plans and ePortfolios
➤ track, monitor and help evaluate students' achievements, standards and progress.

Through their expertise and experience, tutors are expected to support students to achieve their goals and this relationship is an essential part of the school's high quality learning environment.

Student Management

The school is located within the Flinders University. It has strong links with the campus, including sharing facilities, and access to its highly skilled staff. The school connects Science, Mathematics and related technologies directly to the issues in the world today with learning taking place in the university, the workplace, online and in the community.

The building provides for a range of learning settings including face to face and online, coaching, mentoring and students as researchers and teachers. Students may also make use of the extensive facilities within Flinders University such as additional laboratories, libraries, lecture theatres, canteens, sport, recreational facilities and university clubs.

Each student is recognised as an individual, with the relationships developed with others being pivotal success. The physical and emotional wellbeing of each student is supported by a strong connection with their teachers and a climate of trust and mutual respect that inspires and encourages everyone.

Having a school population of 336 students (in 2010) ensures that each student becomes personally known, supported and valued as a member of a dynamic learning community. Movement of students around the university and off-campus facilities occurs under the guidance and duty of care of the ASMS staff.

Charter

The ASMS serves as a statewide focal point for teaching and learning, professional development and research aimed at fostering improvement, innovation and reform in Science and Mathematics education. The school provides new ways of teaching and learning in Science and Mathematics through the creation of an environment for interaction between educators and professional scientists and mathematicians within institutions and industry in South Australia and beyond. The schools' partnership with Flinders University is its main source of interaction.

The ASMS is intended as a resource for every school in the state through its programs of professional development and curriculum enhancement. Students and teachers from across South Australia are invited and encouraged to engage in individual and group visits to the ASMS outreach, exchange and vacation programs.

Teachers from around the state are able to work alongside ASMS staff in the ongoing development of the curriculum and teaching and assessment strategies. This work also informs the review and planning of professional development priorities.

The ASMS:

➤ Responds to current and future interests and needs of its students to establish models of excellence in science and mathematics education
➤ Provides a learning environment of leading edge and enterprise oriented science, mathematics and technology
➤ Provides a learning culture for its students that derives from the learning culture of its staff, which in turn derives from their interaction with university and industry scientists and educators
➤ Is an agency for change and enhancement of science and mathematics education for the state of South Australia and then nationally and internationally
➤ Prepares young people to be creative, critical, informed and motivated contributors responding to professional, personal and social issues
➤ Increases participation and success of senior secondary students in science, mathematics and related technologies and transforms students' attitudes to science and mathematics as career paths

Learning Programs of the ASMS

Learning Vision

The Australian Science and Mathematics School (ASMS) is a senior secondary school promoting excellence in teaching and learning in science and mathematics education.

The ASMS will be recognised for its leadership of innovation and reform of learning and teaching in science and mathematics.

The ASMS is constantly in the process of creating a learning environment for the future that will prepare young people with a passion for study in science and mathematics to be creative, critical, informed and motivated contributors responding to professional, personal and social issues in their world of the future.

Learning Principles

Learning programs at the ASMS are built around the following key principles.

New Sciences

ensuring emerging areas of science such as nanotechnology, aquaculture, biotechnology, photonics, genomics, polymer science, robotics and communication technologies are incorporated into school curriculum.

Inquiry Learning

ensuring students engage in deep study in personal projects of major significance, especially through problem based and inquiry based learning approaches.

Interdisciplinary Curriculum

building programs with a focus on scientific and mathematical processes in ways that are closely linked with learning from all areas of study.

Standards of Significance

providing a systematic approach to allow students to meet school, state-wide, national and international educational standards.

Authentic Experience

allowing students to study real world ideas, problems and issues and to make connections with their learning that are meaningful to them in their present and possible future life circumstances.

Engagement and Retention

providing an impetus that increases participation and success of senior secondary students in science, mathematics and related technologies and transforms students' attitudes to science and mathematics as career paths.

Capabilities

The ASMS actively promotes the development of a designated set of capabilities in all of its students.

Capabilities are diverse knowledge, skills and dispositions that students develop for their roles as citizens, workers and members of local and global communities. A focus on capabilities is a powerful way to develop balance and connectedness across diverse areas of learning and to promote learning that is transferable to many future elements of life.

The ASMS has a focus on six declared graduate capabilities. The capabilities reflect the unique nature of the school and its broad aspirations for our students.

The ASMS certificate of Graduate Capabilities is a statement of the student's demonstration of their capacity to:

- Operate scientifically
- Operate mathematically
- Communicate effectively
- Work both autonomously & collaboratively
- Demonstrate personal & social enterprise
- Demonstrate critical literacy

Central Studies

The learning program for students in Years 10 and 11 at the ASMS is based on the unique courses developed by the school called Central Studies. There are three separate Central Studies presented in each semester over a two year program. There is also a Special Inquiry Project presented as a specific unit of study in the second semester of each year.

Semester 1 (2010)

Mathematics and Abstract Thinking – Patterns of Change (1)

This unit focuses on the mathematical concept of function with investigations related to the areas of sequences and series, finite differences, polynomial, exponential, logarithmic and periodic functions.

Biodiversity

This study involves the understanding of the diversity of life on planet Earth through the role of evolution in the development of species. Major areas of investigation include geological time scales, natural selection, Earth processes such as continental drift and plate tectonics, dating methods and the extinction of species. Other concepts and content include animal and plant structure and function, ecosystems, biodiversity and classification systems.

Towards Nanotechnology

Nanotechnology is the science of working directly at the atomic and molecular level and its potential to greatly change the world in which we live. This study involves the understanding of materials and their properties at macro and micro level and will move towards an understanding of the potential of nanotechnology. Applications and challenges include the working of lasers, fibre optics, communications and the creation of molecular machines to manufacture safer chemicals, detect and remove pollution and for the diagnosis and cure of disease.

Semester 2 (2010)

Mathematics and Abstract Thinking – Modelling Chance and Space (1)

This unit focuses on developing mathematical capability and inquiry skills in the areas of probability, statistics, geometry and measurement.

Biotechnology

This study begins by considering how to use natural processes such as genetics and selective breeding to improve fermentation, crop yield and disease resistance to best advantage. Key concepts and content include cell physiology and function, using proteins and the immune system to assay plant and animal health and the interplay between microbiology, public health and the environment. Other content and concepts include the analysis and use of DNA markers and fingerprinting, genetic modification, gene technology and bioinformatics.

156

The Earth & the Cosmos

This study explores understandings of the sun, moon and stars and their social, spiritual and technological roles. The concepts and content covered include the structure and size of the universe, understandings of time and space, composition of the planets, evolution of the Earth's atmosphere, oceans and geological formations and space exploration. Computer simulation and mathematical modelling of physical phenomena will enhance students' understandings.

Special Inquiry Project

In the Special Inquiry Project students undertake a detailed self-directed study in a area of interest. The Special Inquiry Project promotes the development of research, investigation and inquiry skills as well as the skills and abilities connected with organising and managing a sustained independent work effort. The Special Inquiry Project can be related to and build on works in a existing area of study for the student, or can be with a separate declared area of interest. Work in the Special Inquiry Project can lead to a SACE subject result in either Integrated Learning (Stage 1) or Research Project (Stage 2).

Personal Learning Plan

The Personal Learning Plan is a 10 credit subject at Stage 1 of the SACE designed to help students make informed decisions about their personal developments, education and training. The Personal Learning Plan is a compulsory requirement of SACE. Students must complete 10 credits of the Stage 1 Personal Learning Plan with a C grade or better to gain their SACE.

At the ASMS much of the development work of the Personal Learning Plan is done through the Tutor Group program across Years 10 and 11. Students have the opportunity to demonstrate their standard of achievement with aspects of the Personal Learning Plan through the Learning Conversations conducted in Term 1 and 3 each year.

Semester 3 (2011)

Mathematics and Abstract Thinking – Patterns of Change (2)

This unit focuses on the mathematical concept of function with investigations related to the areas of sequences and series, finite differences, polynomial, exponential, logarithmic and periodic functions.

The Body in Question

In this unit students study fundamental science concepts such as the nature of disease causing organisms and the response of the human body to stress. Students investigate the impact of physical forces such as extreme motion on the body. Students also investigate human health issues through local and global perspectives.

A Technological World

In this unit students investigate various social impacts of developments in science and technology over time. There is a particular focus on understanding developments in the uses of energy and materials over time and the social implications of these developments.

Semester 4 (2011)

Mathematics and Abstract Thinking – Modelling Chance and Space (2)

This unit focuses on developing mathematical capability and inquiry skills in the areas of probability, statistics, geometry and measurement.

Communication Systems

In this unit students investigate how humans exchange, interpret, change, adapt, transform and control information and communications. There is a detailed focus on the physics of electrical communication to understand electrical currents and micro processors, and the chemistry of biochemical communication to understand the structure and function of chemicals such as neurotransmitters and hormones.

Sustainable Futures

In this unit the sustainability of the Earth is explored in concert with human systems and human behaviour. Topics of interest include population studies, food production, water quality and availability, waste management, environmental chemistry and bioremediation. Students are encouraged to undertake investigations that look at the use of technologies to counter degradation and promote sustainable practices.

Special Inquiry Project

In the Special Inquiry Project students undertake a detailed self-directed study in a area of interest. The Special Inquiry Project promotes the development of research, investigation and inquiry skills as well as the skills and abilities connected with organising and managing a sustained independent work effort. The Special Inquiry Project can be related to and build on works in a existing area of study for the student, or can be with a separate declared area of interest. Work in the Special Inquiry Project can lead to a SACE subject result in either Integrated Learning (Stage 1) or Research Project (Stage 2)

157

SACE Accreditation

The work undertaken by students in the Central Studies is mapped against, and formally accredited through, the following SACE Stage 1 subjects under the authority of the SACE Board of SA.

Semester 1 (2010)

Mathematics (10 Points)

Scientific Studies – Biodiversity (20 Points)

Scientific Studies – Nanotechnology (20 Points)

English /ESL (10 Points)

Philosophy (10 Points)

Semester 2 (2010)

Mathematics (10 Points)

Scientific Studies – Biotechnology (20 Points)

Scientific Studies – Earth and Comos (10 Points)

English /ESL (10 Points)

Integrated Learning/Research Project (10 Points)

Personal Learning Plans (10 Points)

Semester 3 (2011)

Mathematics (10 Points)

Scientific Studies – Body in Question (20 Points)

Scientific Studies – Technological World (20 Points)

English /ESL (10 Points)

History (10 Points)

Semester 4 (2011)

Mathematics (10 Points)

Scientific Studies – Communication Systems (20 Points)

Scientific Studies – Sustainable Futures (10

English /ESL (10 Points)

Integrated Learning/Research Project (10 Points)

Personal Learning Plans (10 Points)

Enrichment Opportunities

University Studies

University Studies is an enrichment and extension program conducted in a dedicated session on Thursday mornings. The aim of the University Studies program is to promote a high degree of interaction with Flinders University with short courses provided by university staff. Students have the opportunity to work in mentored projects using university facilities. The University Studies courses provided in recent sessions have been:

Finding a cure for cancer

Science presenter training

Spells, Smells & Explosions

Seven habits for successful people

Web page upgrade

Pod-casting & web animation

Itchy & Scratchy

Universal Sundial Manufacturing Co

Software for maths

Databases

Visual basic programming

Drug Design

Global Citizens Medal

Palaeontology

A Chemist's take on History

The Environment – Through Performance

ICT & engineering computer games

Aviation

Horticulture

Get active outdoors

Supplementary Studies: SACE Focus

These courses enable students to participate in particular areas of interest and expertise. These studies are available for students in Years 10, 11 and 12 and include:

➢ Languages

➢ English as a Second Language (ESL)

➢ Music

➢ Other, by negotiation

Students can choose ONE Supplementary Study – SACE focus per year (2 unit equivalents). Some of these studies are conducted at alliance schools and involve travel to those schools. Negotiations take place with students to join classes in alliance schools as part of that school's timetable.

Students generally identify their preferred Supplementary Study – SACE during the enrolment process or meetings with their Tutor.

Workplace Studies

Students have opportunities to develop and apply their learning in the workplace and community. Many of these opportunities are incorporated in the Central Studies. Student learning outcomes will be accredited within the SACE and against Vocational Education and Training (VET) packages as appropriate.

Through Workplace Studies students will develop an understanding of the world of work and a range of knowledge, skills, competencies and attributes relevant to a wide range of work environments.

Students also have the opportunity to undertake individual Work Experience placements. These are done through individual negotiation with students to suit their particular needs and interests. All Work Experience placements are conducted according to guidelines provided by the Department of Education and Children's Services.

Tutoring and Mentoring Support

The ASMS conducts a Tutor Group program to ensure that students feel a sense of belonging within the school, and to provide a high level of care and guidance. Each Tutor Group is vertically grouped with up to 15 students from Years 10 to 12 who meet for 40 minutes every day with their Tutor. Students work with one Tutor for their time at the school. The student / tutor relationship is an essential part of the school's high quality learning environment. Through their expertise and experience, Tutors are expected to support and mentor students to plan and achieve their goals.

The Tutor Program is a central part of the learning programs of the ASMS and provides the focus for the following aspects of developing student learning:

➢ Personal integration into the school life of the ASMS

➢ The development of a designated Personal Learning Plan (PLP) and a supporting e-Portfolio

➢ Engagement with a program of activities to promote student well-being and learner resilience

➢ Support for pathway planning and making transitions beyond schooling

➢ The preparation and presentation of Learning Conversations

➤ The compilation of a personal profile of achievement in relation to the designated Graduate Capabilities of the ASMS.

Demonstration of Learning

The ASMS is committed to transforming the way student learning and achievement are defined and measured. It is developing and using multiple assessment strategies.

Assessment is ongoing and regular to provide feedback that assists, extends and improves learning. Students' Personal Learning Plans and their individual Tutors are an essential part of providing appropriate and constructive feedback that is meaningful to students, supports and empowers their learning, and contributes to their development.

There is an emphasis on active approaches to assessment involving the students themselves, their families, industry partners, and school and university staff.

The Central Studies involve students in learning in authentic contexts. Learners and teachers work together to negotiate an agreed context for learning to ensure learners have ownership of their learning. Once this is decided, teachers and learners negotiate a method of demonstrating the learning, providing an opportunity to share the knowledge, skills and understandings.

Full copies of the Assessment Plans used for each of the Central Studies are available on the ASMS website under Curriculum – Central Studies – Central Studies Program Outline.

Demonstration of learning and subsequent assessment of this learning may occur in the community, industry or work environments other than the classroom, providing the opportunity to present to an authentic audience. It is important that such environments recognise and value the student's involvement in training, work and community responsibilities.

Staff

Staff Support Systems

The ASMS places a high priority on the professional learning of all staff. Essential to establishing and maintaining the strong learning community, staff are supported to work in collaborative ways. Teams are based around working relationships and include non-teaching staff. All staff are members of a Professional Development team. Supported by a designated team leader, staff report on their Individual Professional Development plans (IPD's), their PD activities and progress in achieving their identified PD goals. Regular review meetings are held with team members providing support for each other to achieve planned outcomes.

Central Studies teams work to develop and implement curriculum for year 10 & 11 students. Each team is lead by a Coordinator: Interdisciplinary Curriculum and as a team are responsible for collaboratively writing curriculum and teaching materials, planning teaching approaches with a strong emphasis on inquiry, ICT and collaboration, monitoring, assessing and reporting on student learning. Central Studies teams consist of teaching staff representing a range of subjects and Flinders University staff with expertise related to the Central Study. Regular meeting times are scheduled for the collaborative work of Central Studies teams.

New staff are supported with an extensive Induction Program that involves ongoing activities and checkpoints to monitor the effectiveness of the program. Specialised professional development sessions are scheduled to ensure new staff are able to develop an understanding of the underpinning principles that drive the teaching and learning approach of the school.

Time is set aside within the timetable of all staff members to participate in a planned professional development program each week. The program is planned each term to address identified staff and school needs and to support staff IPD's. Each staff member is actively involved in Action Research, reflecting on their practice in a focused manner. Linked to the ASMS Strategic Plan, AR projects aim to support staff in making evidence based decisions aimed at improving student learning outcomes.

Performance Appraisal

A staff member's IPD forms the basis of performance appraisal process at the ASMS. Each staff member reports on the connection between the goals of their IPD, their PD activities and changes they have been able to make to their practice in order to better meet the learning needs of ASMS students. In addition Performance Appraisal meetings with the Principal, Deputy or Assistant Principal are also scheduled when the need is identified. Each staff member is entitled to written feedback on their performance and through their IPD team is able to demonstrate strategies to meet the requirements of their role in the school community.

Staff Roles

Teaching staff are employed as Graduating Teacher, Teacher, Co-ordinator 2 or 3, Assistant Principal level 2, Deputy Principal and Principal. Teaching staff are involved in collaboratively teaching, developing and reviewing curriculum, monitoring student learning, and according to their role, professional development program planning, implementation, review and evaluation accordingly. Non-Teaching staff are employed to support student learning and perform administration tasks of the school. Personal Advisory Committee (PAC) provides advice on staff loads and responsibilities in conjunction with Learning Futures and Learning Community Groups and Central Studies teams.

To support the ASMS charter to provide professional development opportunities for teachers and educators across South Australia, staff are provided with opportunities to develop expertise in PD facilitation, coaching & mentoring as well as writing and publishing. For some this may include completion of post graduate studies offered in conjunction with Flinders University and accredited at Graduate

Certificate, Masters and Education Doctorate level. Others may participate in workshops or short courses focused on developing their skill and understanding in a particular aspect of this role. As part of IPD's staff have access to resources to support their involvement in programs of this nature.

At the ASMS each teacher is seen as a leader. As a member of a collaborative teaching team they are a leader of learning, effectively empowered to make decisions that impact on student learning through their contributions to decisions related to curriculum, timetabling, approaches to teaching and assessment and school structures that impact on learning. This distributed leadership model is evident in teacher role descriptions and linked to the Strategic Directions and Professional Development program of the ASMS. Staff involvement in particular leadership activities enables the learning community of the school to learn through their leadership activities and for each to share their insight with other educators.

160

Appendix 2a: Example of a task and rubric from the Biodiversity Central Study

Creative Diversity

BIODIVERSITY Should humanity control diversity?

Name .... Tutor Group Number........... Tutor's name......................

☐ SACE   ☐ Non-SACE   ☐ ESL

Creative Diversity Group.. Teacher ....

Task description and performance standards for the Creative Diversity study

This is a Text Analysis task. Assessment of this unit of study consists of two separate task components

1. Satisfactory completion of a personalised Learning Log
    (Weighting 10% of total semester mark for SACE 1 English)

2. Design and display of two Creative Diversity Bricks (plus written rationale for SACE)
    (Weighting 10% of total semester mark for SACE 1 English)

Instructions for each task are outlined on the Portal pages for each study segment and in the Learning Log. The final display of student products is peer evaluated using a rubric that identifies the degree of commentary, creativity, complexity and ambiguity apparent in each brick and explores how the design concept links to the fertile question in Biodiversity.

Criteria for meeting performance standards are outlined in the task instructions and in the rubric on the reverse side of this page. The Comments box below indicates any negotiated changes to the task and indicates strengths in the student's response and opportunities for further development in skills and understandings.

Learning Context

Students have been developing creative and critical literacies through a study of rich visual images and elements of language. Learning activities have included:
- exploring ways to describe the diversity of the world around us in precise and powerful language
- investigating the different ways that language works in science (mainly denotative language) and in the humanities and mass media (mainly connotative language)
- working in groups and individually through 10 sequenced activities in a personal learning log (see portal for copy) and have selected texts and images to create their own two collage "bricks" of A3 size to create a diversity wall display
- explaining their concept, design features and the challenges of the task to classmates, through a written rationale and in an "art gallery" tour of the final display.

Graduate Capabilities

3.   Communicates effectively
- Can communicate clearly and accurately in Standard Australian English to suit different purposes and contexts.
- Can communicate across a range of modes using oral, written, visual and digital literacies appropriate to the purpose and context.

6. Demonstrates critical investigation and inquiry
- Can identify, locate, access and ethically use a wide range of information and resource technologies.
- Can interpret knowledge and understandings and apply to new circumstances

Creative
Diversity

BIODIVERSITY Should humanity control diversity?

Criteria for judging performance
The student's learning log, the creative design for the bricks and accompanying rationale demonstrate the following Performance Standards, graded on a scale from A-E.

The Creative Diversity Brick design is peer assessed on a separate student rubric.

	Features	E	D	C	B	A
Learning Log	**Knowledge & Understanding of how ideas, values, and beliefs are explored differently in science texts and literature**	Very simple ideas Understanding of language in study texts not clearly apparent in journal entries	Simple ideas based on restricted study texts, investigating limited range of language features in a limited way	Connections among key concepts and language features explored in some detail, Understanding of purpose, context and audience evident in approaches to study texts	Key concepts and Interesting connections explored in comprehensive detail across a wide range of texts with specific language features highlighted Purpose, context and audience explored clearly and competently	Complex and ambiguous concepts explored comprehensively with sophisticated analysis of language techniques Strong investigation of purpose, context and audience in the study texts, with appropriate evidence selected
	Application: evidence from texts is used to support personal perspectives on aspects of Biodiversity	Basic commonsense problem solving; minimal creativity in approach	Some evidence of problem solving and creativity in approach Mainly factual, common sense content presented	Evidence of problem solving and creativity in approach Adequate range of evidence to support ideas Strong factual, common sense content to express ideas	Strong evidence of problem solving and creativity Well integrated evidence in relevant texts to support ideas Moving beyond factual, common sense content to express ideas	Sophisticated skills in problem solving and creativity Detailed and appropriate use of evidence well integrated; references incorporated fluently Communicates complexity and ambiguity of chosen theme
	Communication: accurate, clear and fluent speech or writing	Need for much more attention to editing to achieve accurate and fluent communication	More attention to editing needed to achieve accurate and fluent communication	Generally accurate and fluent communication Appropriately edited	Accurate and fluent writing communicates ideas clearly Strong attention to editing, style and structure is evident	Communicates complex ideas and analysis of these in a sophisticated way. Excellent editing to achieve polished style and structure.
Rationale	**Analysis of connections among aspects of the study topic and of how language choice evokes reader response in a range of contexts**	Few connections apparent with minimal awareness of language techniques	Limited exploration of links Some language techniques explored in a limited way	Range of connections explored analytically Variety of language techniques explored	Interesting connections and strong personal insights in text responses Wide range of language techniques explored competently	Complex and ambiguous connections explored with strong personal insights evident Sophisticated analysis of language techniques
	Communication: In accurate, clear and fluent speech or writing; with appropriate style and structure for the audience and purpose in this task	Need for much more attention to editing to achieve accurate and fluent writing and more appropriate style and structure	More attention to editing needed to achieve accurate and fluent writing and more appropriate style and structure	Generally accurate and fluent writing with appropriate focus on style and structure evident	Accurate and fluent writing communicates ideas clearly with strong attention to editing, style and structure evident	Precise, powerful and sophisticated with excellent editing to achieve polished style and structure.

Grade for Bricks................   Final task grade ....

Teacher Comment:

BIODIVERSITY Should humanity control diversity?

Peer assessment Rubric for Bricks

Work with a partner, using the criteria on the rubric, to assess how successfully the brick(s) communicate the chosen theme in Biodiversity. The grade you award will count towards the final teacher assessment.

Reviewers (1).. (2)..

Producer... TG. ....TG Teacher …..............................

Theme of the brick(s)..

Ask yourself the following questions to award a score between A –E on the rubric:

1. How much interesting knowledge and understanding does the brick show?
2. Is a cohesive theme clearly defined?
3. Is the chosen theme appropriately complex / ambiguous at this level of study?
4. Does the visual content demonstrate artistry and skill in image editing?
5. Is there adequate research into finding a range of poetry (and science texts)?
6. How successfully is the text content integrated?
7. Is the overall design thoughtfully constructed and polished for public display?

	Evidence demonstrated in the brick(s)	E	D	C	B	A	Final Score
Creative Diversity Bricks	**Understands aspects of Biodiversity**	Very simple ideas; no clear theme	Simple ideas; theme not really clear	Key concepts; clear sense of theme	Clear concepts; some depth	Complex concepts; very well developed	
	Shows problem-solving and creativity	Very little problem solving or creativity in approach	Basic, factual, common sense approach	Evidence of problem solving and creativity	Strong evidence of problem solving and creativity	Sophisticated problem solving; creatively communicates complexity and ambiguity	
	Communicates clearly (style, structure, editing)	Needs much more attention to style and structure; lack of editing	More careful focus on style and structure needed	Appropriate focus on style and structure; appropriately edited	Fluent writing communicates clearly; strong attention to editing, style and structure	Communicates ideas precisely and powerfully; excellent editing; polished style and structure.	

Comments:

(Note: Only 3 of the 10 activities shown. Activity 3 involves definitions relating to connotative and denotative language.)

BIODIVERSITY Should humanity control diversity?

Creative Diversity in the Natural World: Learning Log

Name: Tutor Group No.:……… Tutor:…………………………………

Biodiversity Group:…………………………. Teacher:…………………………..

☐ **SACE**   ☐ **Non-SACE**   ☐ **ESL**

Unit Overview

The Creative Diversity unit is an English Language Text Response study, with a focus on poetry and other examples of connotative language.

The aim of the study is to give you new understandings about the power of language to communicate ideas, feelings and sense impressions, with a particular focus on connotative language (which we will define very soon here).

You will have the opportunity to demonstrate

♦   how well you understand the tools and techniques of connotative language, which we will study in this topic, using this Learning Log
♦   how well you can use connotative language to express your own ideas about some aspect of diversity in the natural world, through creating your own product.

You will develop skills in critical literacy, ICT and information literacy through exploring collections of poems in print and online.

You will visit the ASMS library and use the Internet to search for examples of language and visual images and you will use these texts and images to create your own imaginative product that captures some aspects of "creative diversity in the natural world".

About the Learning Task

How will you demonstrate your learning at the completion of this topic?

- You will complete your own Learning Log and create <u>two</u> "bricks" for a wall.
The bricks will capture your understanding of a single theme in biodiversity.
Each brick will be a collage/mosaic/jigsaw of images and text extracts.

- You will also take the class on a tour of our gallery of bricks and talk about your own and other creations.

- The assessment rubrics can be downloaded from the ASMS portal. Please check carefully to see the different task requirements for SACE / non-SACE / ESL.

* For SACE assessment, you also complete an additional written rationale (around 750 words). This explains what you set out to communicate and how successfully you feel the elements of your product convey the key concepts in this topic.
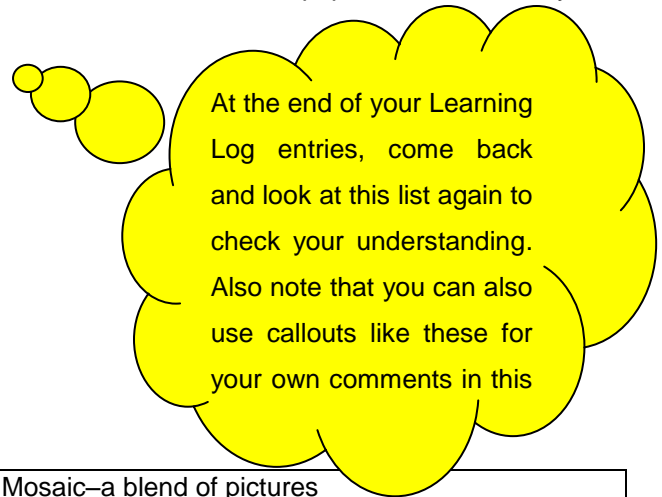
How to use this Learning Log

- You need to work through the 10 Activities in this document. Each is on a separate page to avoid confusion. Some will take only 5-10 minutes, others more time, depending on your background in this area of learning. The idea is that you use the combined skills of the class group in problem-solving.

- You will read the text extracts and the questions, then discuss your ideas with a partner. You do not need to work with the same partners in each learning session. You can also work with your teacher if you prefer this option for extra learning support. Groups working together independently must be no bigger than 4 people.

- You will probably work from a paper copy of the Learning Log in class to facilitate your group discussions. But... you need to download the Learning Log and save to the Biodiversity folder in your own drive with your name in the filename e.g. CD_learninglog_jclayton, as the digital copy will allow you much more scope in commentary and this is what is assessed.

- For the assessment task, you need to use the Ms Word comment tool or find another method to write your comments into your own Learning Log, in an interesting way, to build a picture of your personal learning outcomes (ideas, questions, images, references, useful weblinks). Or, you can create a blog or a wiki using the text digitally if you prefer these kinds of options.

- As you complete each activity, ask a teacher to look at what you have written. If you have completed the segment satisfactorily, he/she will sign off your work. Each activity must be signed off before you proceed to the next, since the learning has been sequenced in steps that build on each other.

Activity 1: Is it useful to define some key concepts?

How many of the terms listed below are familiar to you?

Many of them will be explained as you work through the following pages. At this stage, just take 5 minutes to highlight any that you know and explain what they mean to your partner. You might also want to use the Visual Thesaurus or other paper/online dictionary to help you.

- collage
- mosaic
- jigsaw
- mash-up
- morphing
- denotative language
- connotative language
- imagery
- personification

- simile
- metaphor
- symbol
- motif
- rhyme
- alliteration
- assonance
- onomatopoeia

At the end of your Learning Log entries, come back and look at this list again to check your understanding. Also note that you can also use callouts like these for your own comments in this

Collage–a mixture of photos in one picture	Mosaic–a blend of pictures
Jigsaw–a puzzle of a picture	Mash-up–takes different pictures, to create a whole new picture.
Morphing: Changing an image to look like another, threw a series of captions.	Denotative language–Factual e.g. classification, scientific
Connotative language–emotions feelings, imaginary things.	Imagery–collection of images
Personification–something which is represented as a person.	Simile–comparing two unlike things
Metaphor–a figure of speech.	Symbol–a representation of word
Motif–A recurring symbol	Rhyme–in sequence
Alliteration–repeating the same consonant sound at	Assonance–Simular vowel sounds

the beginning of several words	
Onomatopoeia–a word that seems to imitate the sound or sounds associated with the object or action	

Many of these concepts relate to tools and techniques writers use for creative purposes, just as an artist uses oil paint or clay and a scientist uses equipment and chemicals in the lab. We are all making meanings from the world around us in various ways that suit our purpose.

In a sense, the way we make and modify meanings is Biodiversity in action and also relates to our Fertile Question, which we will revisit several times in the course of the following activities.

Activity 2: How can you think of some themes for your own creative product?
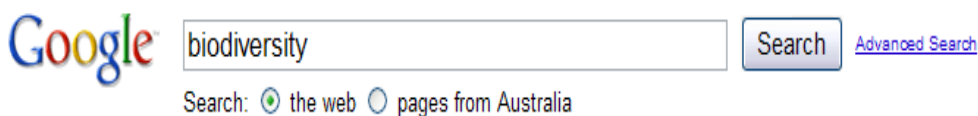
A number of possible themes for study were introduced in the PowerPoint the amazing diversity in the world of nature. What themes could you use for your own study, which may become the subject for the "bricks" you produce?

*Take no more than 15 minutes on this search and discussion, as it is easy to get distracted!

Make some brief notes in your Learning Log, after a discussion with your partner(s) in which you briefly explain your interest in the theme(s).

If you have no ideas, go back and look again at the PPT and do an internet search under the broad topic of Biodiversity. Google will give you 18 million topic hits in less than 1 second!

Web Images Videos Maps News Books Gmail more ▼

Google   biodiversity   Search   Advanced Search

Search: ⦿ the web ◯ pages from Australia

Results 1 - 10 of about 18,800,000 for biodiversity [definition]. (0.21 seconds)

Theme	Discussion
Regeneration	The regeneration within nature, like plant growth
Beauty	Animals can be aesthetically pleasing and then the natural behaviour can be pleasing.
The abuse of technology	Technology like mobile phones get out dated and get thrown away as if it was food, that people will miss treat.
Being free with money	Wealth and having money, buying things that you may want and being able to do endless things
What's bad about creepy crawlies	They are small, dirty, and they look scary.

Write your notes then ask your teacher to sign them off before you move to the next section.

Activity 3:How can we find out what 'denotation' and 'connotation' mean... and anyway, does it matter?

Discuss the following questions with your partner(s) and use a dictionary or the web to identify:

1. Which form of language
   - ♦ is a scientific language
   - ♦ that catalogues and categorises specimens
   - ♦ into a typology or taxonomy

- ♦ in ways that are defined by "experts"
- ♦ according to specific features that this specimen has
- ♦ that are the same as or different from other specimens?

Answer …Denotative……..

In which kinds of texts would you expect to find this kind of language? (Suggest 3 text types)

Science Report

Documentary

Method or set of instructions to complete a task

2. Which form of language
   - ♦ has emotional, intellectual and imaginative impact on the brain, triggered by words (or words+images)
   - ♦ creates pictures, ideas, feelings and memories that words conjure up when used in certain ways
   - ♦ is also called figurative language?

Answer ……connotative…………..

In which kinds of texts would you expect to find this kind of language? (suggest 3 text types)

Romeo & Juliet – Romance

Shakespeare in love – Novels

The Dead Poet Society – Autobiography s

3. Why might understanding the difference be useful?
   You would use Denotative language when you are writing a Scientific Report, or when you are talking about something that is serious, like laws, rules and papers. You would use connotative language when writing a story, or a play, words which paint a picture in your head, with the most possible detail of imagination.

4. Give an example of each form of language <u>describing the same natural object</u> (eg a whale, a raindrop or a mushroom, both denotatively and connotatively). Ask your teacher for help as required.

Denotative language

The Penguin is from the Animalia kingdom, it is an aquatic bird, which is mainly black and white, and can variety in size from as little as a foot to as tall as a meter in size.
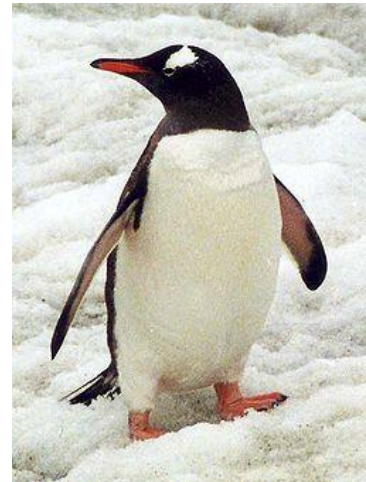
Appendix 2c: Student sample of two created poetry bricks, samples from the learning log, the student written rationale and

reflection on the task
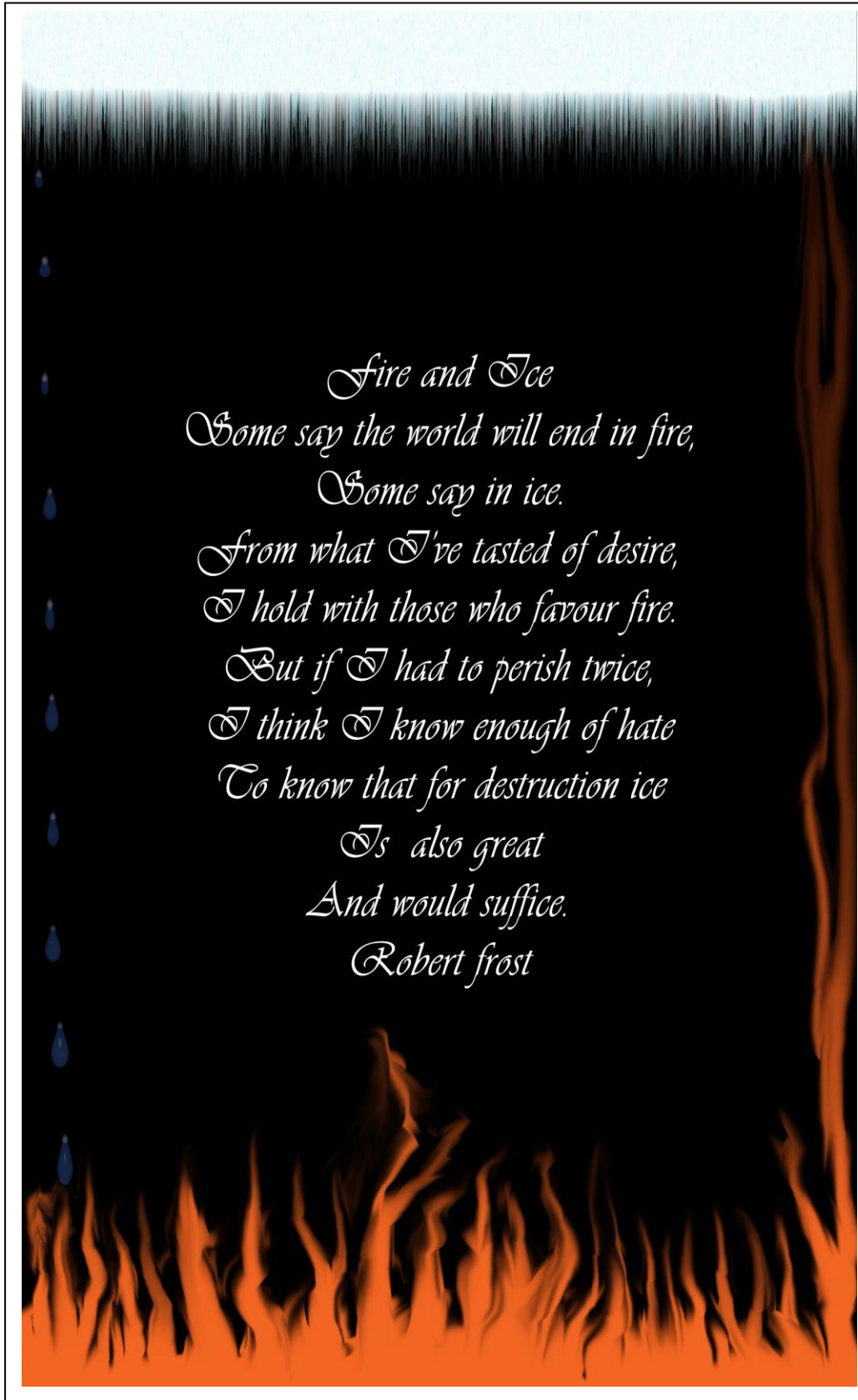
Fire and Ice

Some say the world will end in fire,
Some say in ice.
From what I've tasted of desire,
I hold with those who favour fire.
But if I had to perish twice,
I think I know enough of hate
To know that for destruction ice
Is also great
And would suffice.
Robert frost

Poetry Brick 2

Invisible air
Unseen until it attacks
Destroying all life

Earth
Deadly, murderous
Growing, changing, moving
thorns, poisons, tornadoes, hurricanes
flying, falling, crashing
risky, dangerous
Air

Animals live off
The earth without realising
It lives off us too

Excerpts from Learning Log

Activity 1: Is it useful to define some key concepts?

How many of the terms listed below are familiar to you?

Many of them will be explained as you work through the following pages. At this stage, just take 5 minutes to highlight any that you know and explain what they mean to your partner. You might also want to use the Visual Thesaurus or other paper/online dictionary to help you.

♦ collage
A group of pictures that are stuck together as a piece of work.

♦ Mosaic
A mosaic is a picture made up of small tiles of glass or other materials. In literature it could be a scene made up of small pictures that combine together.

♦ jigsaw
A puzzle made of pieces that connect together to form a picture, jigsaws can be difficult or easy.

♦ mash-up
A mash-up is when elements of different source material are combined to create on piece of work.

♦ morphing
Changing into something new and different.

♦ denotative language
Denotative language is a type of language that describes things scientifically, how they are not the emotions or

♦ simile
Comparing something to another thing using words including as or like. A direct comparison.

♦ metaphor
Similar to a simile, but saying that something *is* something else. An implied comparison.

♦ Symbol
A symbol is something that represents something else, like an object or a feeling.

♦ motif
A symbol, image or word that keeps appearing or recurring.

♦ rhyme
Using words that have the same sound to create a sort of rhythm.

♦ alliteration
A string of words starting with the same letters and sounds, alliteration creates a rhythm.

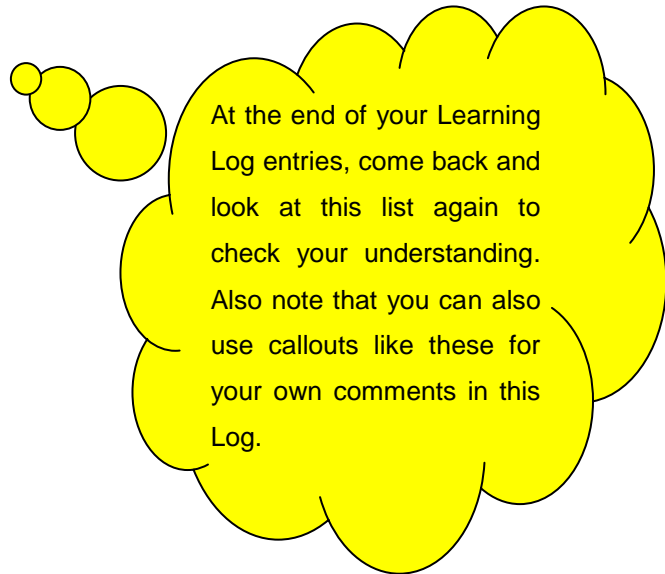♦ assonance
Similar to alliteration, but with words that have the

feelings they inspire or any opinions you may have.

♦ connotative language
Connotative language is a type of language that describes the feelings and emotions an object creates and what it may symbolise.

♦ Imagery
Imagery uses detailed descriptions to create a picture of a scene or even in the readers' mind.

♦ personification
Making an object or an animal seem like a person by making them talk or portray other human traits.

same vowels.

♦ onomatopoeia
Words that sound like the sound they are describing.

At the end of your Learning Log entries, come back and look at this list again to check your understanding. Also note that you can also use callouts like these for your own comments in this Log.

Many of these concepts relate to tools and techniques writers use for creative purposes, just as an artist uses oil paint or clay and a scientist uses equipment and chemicals in the lab. We are all making meanings from the world around us in various ways that suit our purpose.

In a sense, the way we make and modify meanings is Biodiversity in action and also relates to our Fertile Question, which we will revisit several times in the course of the following activities.

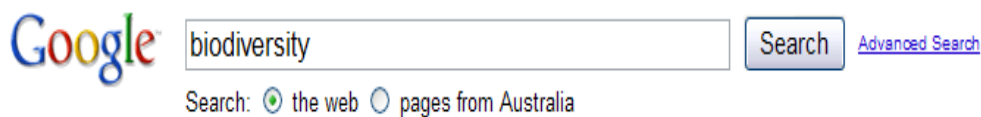# Activity 2: How can you think of some themes for your own creative product?

A number of possible themes for study were introduced in the PowerPoint the amazing diversity in the world of nature. What themes could you use for your own study, which may become the subject for the "bricks" you produce?

*Take no more than 15 minutes on this search and discussion, as it is easy to get distracted!

Make some brief notes in your Learning Log, after a discussion with your partner(s) in which you briefly explain your interest in the theme(s).

If you have no ideas, go back and look again at the PPT and do an internet search under the broad topic of Biodiversity. Google will give you 18 million topic hits in less than 1 second!

Web Images Videos Maps News Books Gmail more ▼

Google | biodiversity | Search | Advanced Search

Search: ⦿ the web ○ pages from Australia

Results 1 - 10 of about 18,800,000 for biodiversity [definition]. (0.21 seconds)

Write your notes then ask your teacher to sign them off before you move to the next section. I have found a couple of themes that interest me; one is space, because it is so vast and different, it seems almost impossible and unreal in a way because I've never been there or really seen it. Space seems so mysterious. The other theme that really interests me is marine life; mainly creatures living in the sea. It seems so strange that they can breathe in water whereas humans will drown in it, and we think we are superior. Another theme I really like is that of nature and the elements.

Discuss the following questions with your partner(s) and use a dictionary or the web to identify:

5. Which form of language
    ♦   is a scientific language
    ♦   that catalogues and categorises specimens
    ♦   into a typology or taxonomy
    ♦   in ways that are defined by "experts"
    ♦   according to specific features that this specimen has
    ♦   that are the same as or different from other specimens?

    Answer: Denotation

    In which kinds of texts would you expect to find this kind of language? (suggest 3 text types)

    *   A dictionary
    *   An encyclopedia
    *   A thesaurus

6. Which form of language
    ♦   has emotional, intellectual and imaginative impact on the brain, triggered by words (or words+images)
    ♦   creates pictures, ideas, feelings and memories that words conjure up when used in certain ways
    ♦   is also called figurative language?

    Answer: Connotation

    In which kinds of texts would you expect to find this kind of language? (suggest 3 text types)

    *   Novels
    *   Newspaper articles
    *   Newsletters

7. Why might understanding the difference be useful?
    Understanding the difference might be useful in understanding what people mean by the words they use, it could also be useful when you need to write a description in one of the language types.

8. Give an example of each form of language describing the same natural object (eg a whale, a raindrop or a mushroom, both denotatively and connotatively). Ask your teacher for help as required.
    The denotation for a dove would be a usually white bird which comes from the same family as the pigeon. The connotation would be that a dove represents peace, gentleness and purity.

BRICKS IN THE WALL REFLECTION

When creating my brick, I toyed with many ideas such as space, marine life, and nature before finally deciding on the theme of nature and the elements, and how dangerous nature can be.

One poem that I really like is *Fire and Ice* by Robert Frost. I included this as part of my first brick along with a fire, ice and water style background that I created using Adobe Photoshop CS2. I reasoned that ice is pretty much water so the first brick was based on fire and water, two of the four elements. *Fire and Ice* is a great poem where the poet is describing the benefits of death caused by fire and ice, so it really fitted my brick in the way that it hints at the dangerous aspect of these elements.

For my next brick, I started creating a space picture and haiku before realising that outer space isn't really a part of nature, planets could be classified as part of nature but outer space isn't really. I then created a brick which symbolises earth and air. Once again I created the background in Adobe Photoshop CS2. I created the background to show the dangerous and deadly aspects of both air and earth. My brick shows a tree covered in thorned vines with a tornado in the background. If you look carefully you can also see a snake camouflaged in the tree. Finding poems for this brick was a lot harder so I wrote two haikus, one based on air, and the other based on earth. I also wrote a diamante poem about earth and air. In these poems I tried to capture the danger of nature and the elements, to suit my theme.

I really enjoyed creating these bricks; I thought they were a great way of expressing creativity and ideas, I would like to do something like this again.

Creative Diversity – Rationale

When we say 'You're just another brick in the wall' it means that you are just another ordinary person or object like all the other 'bricks'. If we have diversity bricks it represents our world having diversity as an everyday thing, not something that is being continuously diminished. "Yellow Brick Road" to me means a path to something of fulfilment and if we had plenty of diversity than our world would certainly achieve this.

For our activity we created a 'brick' using collage techniques. A collage is a collection of images, text, anything that is conveyor of communication really. When we collect these images and texts and so forth we generally have an underlying theme. This collection then creates an overview of that theme, a bigger picture so to speak.

We then either used someone else's poem or wrote one ourselves. Writers, especially poets, can use an array of techniques to create 'pictures' in words; the main technique used is referred to as imagery. Then by using descriptive, evocative words they concoct this mental picture, this includes colour, size, shape, feel etc. They can also set out their writing in a way that emphasizes the words to help us create an image in our mind, describing things that appeal to every sense (the taste, the feel, the sight, the noises, the smell) so we can envision a well-rounded image in our minds. Many different formats can be used to target the type of imagery the poet wants the reader to imagine. E.g. short, abrupt styles will result in a to the point type of feeling (even if there is a hidden meaning behind these words) whereas long drawn out formats could relate to poems with deeper meaning and more of story to them. In my opinion, when dealing with imagery, adjectives are the key.

I chose to focus more on the flora and human interactions with this flora. Forests and trees can be so beautiful and majestic and hold a home for other fascinating creatures yet humans decide to destroy this nature that has taken so many years to create in mere seconds.

You could interpret my brick in a few ways, you could consider it as life and death (of a forest) but what my intended them was why has society started as something beautiful and turned into something so selfish and fraudulent?

As opposed to using another person's poetry, I chose to write my own poems for this task, I thought that way I could really pinpoint what my intention of my bricks were. I think the different type of words used in my text will capture people's imagination and draw them into my perspective.

I hope the viewers of my bricks will find the stark contrast between the two bricks; the colourful affluence of the first one and the grey destruction of the second.

I am quite happy with my outcome therefore I wouldn't change much next time. I didn't want my bricks to be too overloaded with images and let the 4 images and poetry stand for itself and let people's mind construe the bricks themselves.

I found that some of other bricks I have seen did not really apply the collage technique and some did not choose the best pictures to correspond with their poetry. I also thought some did not understand the point about choosing diversity as the main topic.

The more successful bricks I believe had done the opposite and chosen a good topic with good collaged pictures and a suitable text extract. Presentation always helps and I believe colour-scheme and making the writing a colour that is readable is also helpful. I believe some of the shorter poems were quite successful as the format allowed the point to be conveyed easily without consuming the entirety of the brick.

Of course when dealing with other people's work we need to reference, therefore here are the sources of my pictures;

Jatin Malhotra, Dec 2009 'Green Bonus for Saving Forests' [On-line Available] http://www.topnews.in/green-bonus-saving-forests-2230876 (Accessed 23rd April 2010)

Author unknown, 2008 'Things to do in Africa' [On-line Available] http://www.top-things-to-do.com/africa/rainforest.jpg (Accessed 23rd April 2010)

Author Unknown, 2009 'Jungles of the World' http://www.tqnyc.org/2006/NYC063206/2.jpg (Accessed 23rd April 2010)

'Rising CO_2 Levels' http://globalwarming.house.gov/impactzones/amazon/admin/pages/files/0001.jpg

http://realestatetwincities.net/wp-content/uploads/2007/10/istock_000003249271devastation480x319.jpg (Accessed 23rd April 2010)

Environmental Defense Fund, July 2007 [On-line Available] http://www.edf.org/content_images/rainforest_destruction_250.jpg (Accessed 23rd April 2010)

Victorian Rainforest Network, 2008 http://www.vicrainforest.org/images/rfbawbawburnt.jpg (Accessed 23rd April 2010)

Communication Systems

Response to the Fertile Question

"Are we the controllers or the controlled?"

Your task is to prepare a response to the fertile question. You can choose to respond to the question in the way that best suits your thoughts about the fertile question.

Your response could be:
- a cartoon, comic strip, collage with a strong message, website which contains appropriate graphics and illustrations.
- an "unusual written response"
    - a transcript of a radio interview,
    - memoir of a significant person involved in the communication system
    - poem
    - something that you negotiate with your teacher
- a taped or filmed interview.

You must write a comprehensive comment on ideas that you are portraying and processes used in developing and producing your response.

It is up to you to choose how you respond to the ideas from the teaching units.

Examples
You could respond to just one aspect of the course:

For example:

- My response will be about chemical control of our bodies.
- My point of view is that we don't have any control, as we are completely controlled by the chemicals in our bodies.
- My audience will be ASMS Central Studies students.
- My response will be in the form of a cartoon strip something like a Dr Frankenstein story.
- My length will be 4 frames

OR: You could respond to all of the teaching units together:
For example:

- My response will be about all the ways we are controlled and the ways we are controllers.
- My point of view is that we are controlled and controllers at the same time e.g. we control the media by paying for or watching particular things and then are controlled by it, we are in control of our bodies by the food we put into it but are then controlled by the chemicals in the food.
- My audience will be a general audience of teenagers and adults.
- It will be in the form of a digital story with voice, music, photos and video. (Approx. 3 minutes.)

Examples of topics which you could include in your response:

Global media and control of the Australian Media
How book are constructed to influence their readers
How digital media is used to create an emotional response
The control mobile phones have on teenagers' behaviour
The control electricity has over our lives

Control over plant growth gives us control over world hunger

Communication Systems   SACE Rubric

Name_____

CS Group _____   Tutor Group _____

Fertile question: Are we the controllers or the controlled?

	Beginning	Developing	Proficient	Accomplished	Exemplary
Planning Sheet & Reflection _/5	No planning sheet or reflective comment on any aspect of the course	Evidence of planning but poor quality reflection.	Basic planning sheet submitted and some attempt to reflect on learning across the COS units	Detailed planning sheet submitted and links and reflection made across several COS units	Detailed planning sheet submitted and insightful reflections across the COS units
Concepts, ideas and form of presentation (including organisation) _/10	Concepts and ideas unclear, inadequately developed and poorly represented or organised.	Concepts and ideas are recognisable but not adequately represented in a logically developed written, visual or combined written and visual text. Much more elaboration is required.	The key concepts and ideas are represented in the texts, products or presentations in response to the question but a sharper focus, further elaboration and/or cohesive links are required.	The central ideas or concepts are clearly established and are represented and developed and/or illustrated in a well formed and directed answer to the fertile question.	The central ideas and concepts are clearly established and explored and are presented convincingly in a well-developed and illustrated answer or product as a response to the fertile question (may be presented in a creative way.)
Comment on intention, audiences & processes. Link to aspect(s) of study in COS _/10	No supporting comment to demonstrate processes and thinking and limited or no to link to aspects(s) of COS	Some supporting comments provided to detail processes but needing further detail. Limited attempt to make a link to ideas in COS.	Some comment provided about purpose, and the processes gone through in developing the final text or artefact. Clear link to aspect(s) of COS	Detailed statement about intention, purpose and how you went about developing the text or artefact. Links top aspect(s) of COS made explicit and reflected on.	Comprehensive comment about intention, audience and process in developing text or artefact. Explicit links to aspect(s) of COS and deep reflection evident.
Features of chosen form to present answer _/5	(list features here) ▪ ▪ ▪		▪ ▪ ▪		
Language and conventions _/5	Inappropriate choice of language, register and/or visuals. Many errors in the use of the conventions appropriate to the chosen form of presentation.	Choice of language, visuals and form of presentation shows an inappropriate level of formality for the task and little understanding of purpose and audience needs.	Choice of language and visuals convey ideas adequately and demonstrates a clear understanding of appropriate conventions e.g. choice of register, but errors or inappropriate choices still exist.	Choice of language and visuals convey ideas clearly and demonstrates a competent understanding and usage of appropriate conventions for written and/or visual texts for the chosen audience, purpose and focus question	Language and visuals are entirely appropriate for the audience and purpose and question and demonstrates a sophisticated and highly competent understanding and usage of conventions for written and/or visual texts.
Comment					Mark _/35 Grade ……….. Comment by

Appendix 4: Theoretical and pedagogical issues to be considered in the incorporation of subject English within an interdisciplinary curriculum

English and Interdisciplinary Studies - the Links
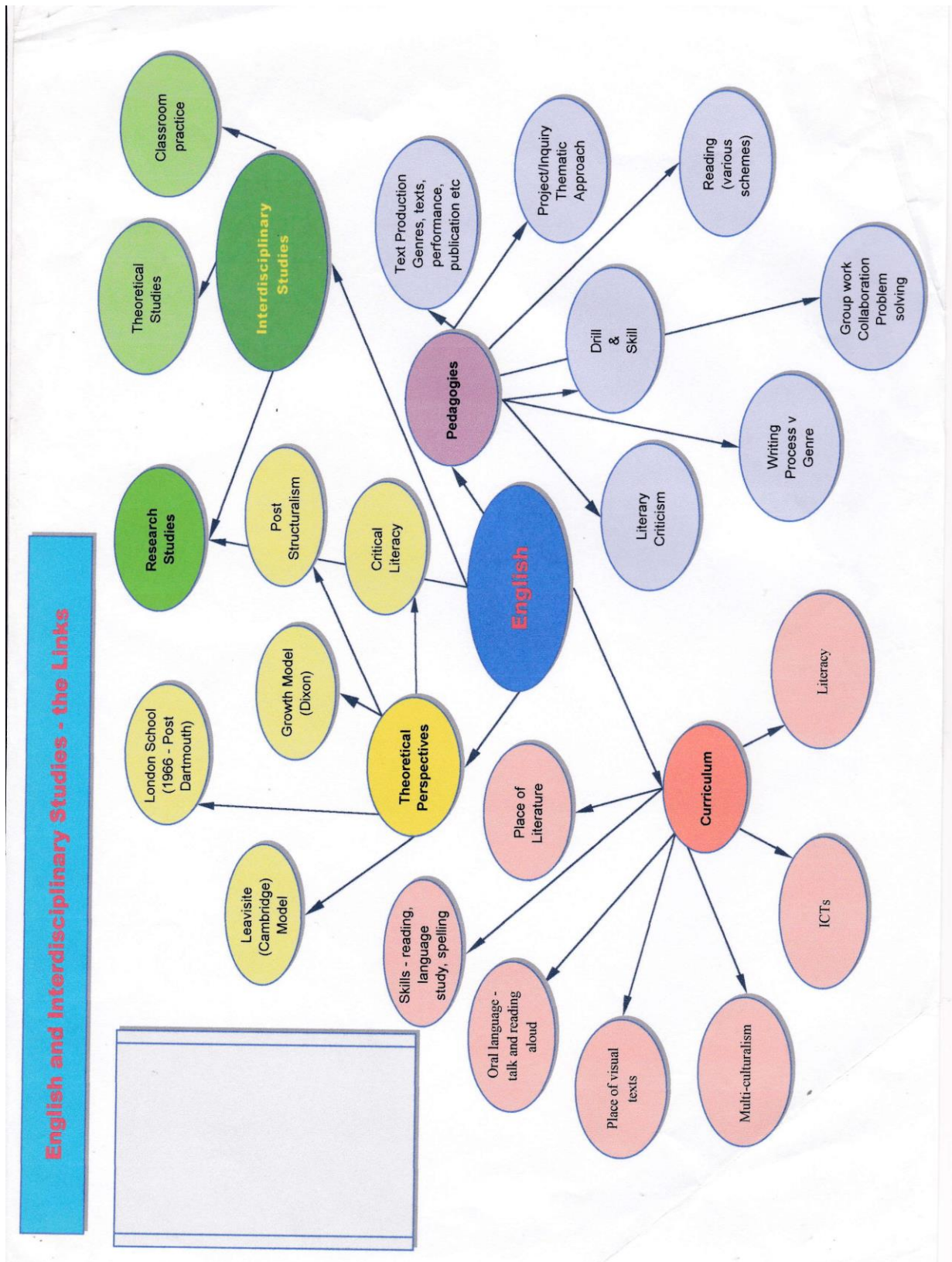
Appendix 5: Example of teacher notes from the Variety of Life Central Study (Selection of pages for Activity 1 only). Note: Not all teachers were English trained.

VARIETY OF LIFE

Variety, the spice of life through literature 1   Teacher Notes

Approx. 16X100minute sessions for *Read, Read, Read* task and *Oral Histories* task.

Activity 1: Introduction to *Read, read, read unit* (Needs 2 to 3 Sessions plus homework time)

> This could lead to a very interesting discussion about what students see as the value of literature and fiction in particular.

INTRODUCTION
Literature gives us the opportunity to see the world through another's eyes. Although books, films, magazines, tapes, CDs and electronic sources contain information, the way they are written and presented gives us an insight into the values and attitudes of others and the way they live.

> Could talk about the differences between the following forms compared with others like reports, information texts

In novels, short stories, plays, narrative poems, anecdotes or other kinds of fiction, these insights are represented through imaginative worlds.

> May need to explain what a memoir is etc.

In biographies, autobiographies, memoirs and real stories are based on actual worlds even though there will often be interpretations according to the writer's, teller's or producer's point-of-view.

> Discuss the term point-of-view

In this unit of work, there are two related components:

- The first relates to oral histories, or the stories people have to tell about their lives or experiences – sometimes referred to as 'real' stories

> Look at the scope of what we mean by imaginative worlds

- The second is to do with imaginative literature or the way that writers create a world through which to convey something about how humans (sometimes represented through using metaphors or fables relating to animal, fantasy or other types of systems or societies) behave, think or construct value systems.

The focus for the reading component of the course

In other sections of the *Variety of Life* Central Study, you will engage in activities, investigations or tasks that look at aspects of cultural diversity. In this section of the *Variety of Life,* you will be required to choose and read a novel that shows some aspects of life in a way that is different from your own.

For instance, you might consider novels that are:

- in a cultural or family setting different from your background e.g. if you happen to be an Australian from Anglo descent, you might consider a novel set in Africa, India, Israel, Iraq, Afghanistan etc. or you could choose an Australian novel but one that represented a migrant or other cultural experience
- in a different time setting e.g. during one of the World Wars, in the Victorian era, or great, great grandma's colonial experience
- fantasy that might involve mythical figures or creatures, or make believe worlds, such as in the *Lord of the Rings,* the *Nania* series or Emily Rodda's *Deltora Quest series -* or even *Animal Farm* by George Orwell or some of the rather dark Gothic novels.
- set in a science fiction world, most commonly futuristic but not necessarily so.

Reminder:

You might choose an Australian novel for this activity, but it would need to be one that involved a culture different from your own e.g. using Indian, Greek, Italian, Norwegian, Chinese etc. characters. For this activity, please avoid American, Canadian or English novels that show lives that are very similar to Australian life as you experience or know it.

Choosing a book

You can choose your novel from the Sturt Library, from home, from a public Library or from friends.

Just make sure that you check with your teacher to [You will need to allow time for a visit to the Library] your usual lifestyle or meets the criteria above.

When you have chosen your book, there is a [Bibliographical Reference Sheet](#) to complete.

Before you choose a book however, there are some activities to do as a whole class with your teacher and there are some things you need to know.

What do you need to do to complete this reading component successfully?

This part of the course satisfies the requirements or one of the Text Response components of a Stage 1 English Unit.

To satisfy the requirements you will need to complete all of the *formative* and the *summative* tasks. These will be based around a series of activities, a formal written response (summative task) and a reading journal.

Activity 1	Read, Read, Read	Bibliographical sheet and activities
Activity 2	Plot diagrams, Setting and Style	See PowerPoints and activity sheet
Activity 3	Characterisation and Figurative language	See PowerPoints and activity sheet
Activity 4	Theme	See PowerPoints and activity sheet
Activity 5	Response to text	Activity sheet

* The due date for the journal and summative task will be Week 8

185

Variety of literature – Train activity (teacher directed)

Your teacher will direct you through this activity which is designed to help you define what we mean when we use the term literature and what kinds **genre**, **forms** or **text types** can be classed as literature. It will also help us to focus on the idea of variety as it is represented through literary works.

Keeping a reading journal

Keeping Reading Journals about texts that you have read or watched allows you to put your thoughts and Ideas on paper. By using a variety of note-taking methods, often makes it easier to see links between ideas that can contribute to your final summative response.

Use of imagery, metaphor, dialogue, layout etc.

Your journal could contain:

Description

- brief notes in which you analyse of comment on what is happening
- brief character sketches and comments about their roles and influence on the plot structure or story line
- notes and ideas about the ideas and messages the writer is getting across or which you the reader see
- comments about the importance of setting, stylistic features, language used etc.
- annotations of some selected passages

Emphasise the need to support their views by referring to the text/using quotes etc.

- plot diagram (using *Inspiration* or some such graphic)
- your own responses to aspects of the text (or the whole) with some justification or at least reference to particular episodes or events that support your view
- you may also think of other ways e.g. pictures or diagrams, a translation of the text into another genre (such as a segment in a novel or short story into a film or drama script) etc.

Note: Some students scan passages that are significant or illustrate key ideas or features and then annotate them. Certainly, recording particular passages or dialogue which is well written or carries significant meaning is encouraged.

Emphasise that the journal is a learning

A journal is a working document and does not need to be polished. It is designed to help you think about your reading and engagement with the text as you go.

Make sure you **date your entries**. Keep all the ideas together in a plastic sleeve or a folder, so that you can hand all this work in together.

Read, read, read bibliographic reference sheet

Go to the Read, read, read Bibliographic Reference Sheet and complete the bibliographic details. Don't forget to get the teacher check to ensure that you have the entry recorded in the correct Harvard format.

Then begin the responses to questions 1-7. Record your answers to these questions in your Reading Journal and be prepared to share them with someone else in the class. This needs to be checked off on the Peer Assessment Sheet (which also needs to be passed up with your Reading Journal at the end of the unit.

Students will need to be given some time in class to read and to share their reading. The activities below are designed to provide a focus for the reading and to get students used to using their Reading Journals.

There's no problem with them discussing these questions but they do need to write up their own individual/personalised reading journal

Visual Texts

Module	Intended Student Learnings: Concepts and content, processes, skills, perspectives and attitudes	Graduate Capabilities	Activities and Resources	Time
Key ideas Visual texts	Students can:		(these PowerPoints and worksheets are found on the LMS)	x 100 min
Students choose either Picture books and Graphic novels • Students will View a range of picture books and graphic novels, prepare an annotated bibliography of texts explored, and create a design (accompanied by editorial notes) for a new picture book or graphic novel	*Show that they understand the key concepts and content of picture books and graphic novels:* • Understand the power of visual information in telling a story. • Identify the structure of the communication in visual texts • Explain how authors, illustrators and program designers use a combination of words and illustrations to create a story. *Demonstrate the following processes and skills:* • Critical analysis and evaluation of texts • Model reading aloud. • Skills in visual literacy (understanding the use of colour and tone, realistic pictures as opposed to representations eg cartoon) • Show how a text and illustrations work together to support the reader	3.1 Can communicate clearly and accurately in Standard Australian English 3.2. Can demonstrate oral, written, visual and digital literacies to communicate ideas and information 3.3 Can understand the nature of different audiences and judge how to best communicate with different audiences 3.4 Is able to produce and present information in a variety of formats - written, oral, visual and digital 4.1 Can work in a self directed way 4.2 Shows personal planning and organisation skills 4.4 Can work cooperatively with different	Text Response Teaching notes As a group: • Explore together a range of visual story texts including picture books and graphic • Examine features of artwork and colours. "line and colour" Rendering with pastel, crayon, soft pencil? Mixed medium? Why these colours? Individually: • Demonstrate, display and deconstruct a range of visual texts • Create a scrapbook to record information about elements such as setting, characterisation, relationship between print and illustration etc.	10 x 100min

Students will develop a range of understandings about picture books and graphic novels, explore their own perspectives, and attitudes and develop processes and skills for communicating about this genre of visual texts	• Show understanding of design and production (pagination, cohesion, layout, artists medium) *Demonstrate the following perspectives, and attitudes* • Understanding of purpose, audience and form. • Capacity to examine values and perspectives, beliefs, concerns and points of view as represented within texts	groups 4.5 Can undertake a range of roles in productive teams 4.6 Can provide leadership in a team context 4.7 Can contribute to a team achieving its desired goals 6.1 Can select from a range of tasks and generate appropriate strategies. 6.2 Can select, interpret and compare information from a range of sources 6.3 Can interpret knowledge and understandings and apply to new circumstances or create new products 6.4 Can evaluate performance on a task, reflect on new learning, respond constructively to feedback by applying advice to new tasks 6.5 Can demonstrate an understanding of a variety of texts, their purposes and characteristics	• Develop a PROPOSAL for a new picture book or based on a previous publication *ESL:* *read a picture story aloud plus* • *interview people about books they enjoyed as a child or* • *interview young children about favourite stories and why* **Resources** Collection of picture books from ASMS and Sturt libraries (and teacher and student collections) • *Rosie's Walk* Children's book • *The Tin Pot Foreign General and the Old Iron Woman* Adult level • *Piggybook and Gorilla* issues about family life. • *Sophie* focus on author and audience • *The Watertower* sequencing • *Long Red Scarf* book design, cover image, motifs • *Where the wild things are.* • *Animalia.* • *Where's Wally* • *Authors.* Julie Vivas, Gary Crewe and Steven Woolman. Mem Fox and Craig Smith. Graeme Base. RaymondBriggs. • *Paper engineering:* The Jolly Postman. Alphabet book.

10 x 100 m

or	Macbeth		Text Response

Macbeth

- Students will read William Shakespeare's *Macbeth*, view filmed versions and develop an individual or group performance (accompanied by editorial notes) in response to the play.

- Students will develop a range of understandings about dramatic texts, explore their own perspectives, and attitudes and develop processes and skills for communicating about this

---

Macbeth

Students can:

Show that they understand the key concepts and content of a dramatic text

- Understand that a dramatic text is generally written for live performance (stage, radio, TV, film)
- Identify the importance of context (historical, social) of a dramatic text
- Understand the process of staging a play
- Understand a dramatic text as a construction by the author

Demonstrate the following processes and skills.

- Ability to extract meaning from reading and viewing the play
- Capacity to critically analyse the text (print or video) for key features
- Examine and understand how drama communicates at various levels
- Capacity to compose a short performance based on the text being studied

Demonstrate the following perspectives, and attitudes

- Understand the entertainment value of a drama text
- Understand that any text represents various values and beliefs (social

---

3.1 Can communicate clearly and accurately in Standard Australian English

3.2. Can demonstrate oral, written, visual and digital literacies to communicate ideas and information

3.3 Can understand the nature of different audiences and judge how to best communicate with different audiences

3.4 Is able to produce and present information in a variety of formats – written, oral, visual and digital

4.1 Can work in a self directed way

4.2 Shows personal planning and organisation skills

4.4 Can work cooperatively with different groups

4.5 Can undertake a range of roles in productive teams

4.6 Can provide leadership in a team context

4.7 Can contribute to a team achieving its

Text Response

As a group:

- Examine aspects of the life and plays of Shakespeare and aspects of the era in which he lived
- Focus on how he interprets tragedy, the supernatural, and how he uses the theatre technology of his time
- Focus on the modern stage and film technology
- Critically analyse the text (both print and video format) for characters, relationships, significance of setting, crisis points, themes, motifs,
- Explore how staging and cinematography can impact on communication (for writer, director, actors and audience)
- Examine and understand communication at various levels within the play (action, characterisation, mood, themes, beliefs, moral messages)

As an individual:

- Plan own performance (within a group performance) relevant to

genre of visual texts.	desired goals	the text studied, including noting and planning, rehearsal
relevance) • Ability to respond both positively and critically to own and classmate's performance of drama	6.1 Can select from a range of tasks and generate appropriate strategies. 6.6 Can select, interpret and compare information from a range of sources 6.7 Can interpret knowledge and understandings and apply to new circumstances or create new products 6.8 Can evaluate performance on a task, reflect on new learning, respond constructively to feedback by applying advice to new tasks 6.9 Can demonstrate an understanding of a variety of texts, their purposes and characteristics	• Complete a written proposal for the production of a scene from the original text or a modernised version (5mins per person). Include visual material and textual evidence to support the proposal. • Take part in a short live or filmed performance, which includes introduction and reflective commentary *ESL students will:* *take part in live performance plus* • *interview teachers or host parent eg about why Shakespeare is famous and why live drama is less/more interesting than films/Tv* • *or make a speech about some aspect of the play* • *or introduce and conclude the scene being played* Resources Cambridge Macbeth (print text) Videos – Polanski's Macbeth and BBC production. ABC In search of Shakespeare LMS worksheets and assignment

| | **Body in Question:** **Text Response** |

TALKING ABOUT BOOKS – STUDENT EXERCISES AND TEACHER NOTES

Session 1

1. Group discussion

Ask students to talk in groups of 3 or 4 to share information about reading habits and preferences.

2. Individual record

Ask students to complete the attached sheet

3. Class discussion

Class discussion about any texts that relate to

Immunology

- disease

- technology or other discoveries such as vaccines etc.

- stress

Mental health

- stress and sleep disorders

- technology

- mental illness and institutions

Physiological health

- lifestyle and fitness

- nutrition, diet, digestion

4. technology e.g. x-rays, drugs, sport etc.Reading log

   Discuss various alternative ways of keeping one

   - book

   - loose leaf and plastic inserts

   - electronic (use of a scanner etc.)

   - blog (this is the preference)

Margin notes, highlighting or underlining

Scanned text with commentary alongside

Paraphrasing and quotes with personal response and commentary.

Related articles and clippings from other sources e.g. newspapers, brochures, magazines, journals etc.

Pictures, illustrations, cartoons with a commentary to make the connections with the chosen text

The Reading Log is a tool to record the observations, ideas and thoughts which will help with the final response.

The Reading log will need to be passed up with the final summative piece.

5. Visit the library

   Need to choose from

   - novels

   - short stories (not necessarily the one collection)

   - drama texts

   - biography and autobiography

   that relate to one of the themes listed in 3 above.

Appendix 8: Example of an interview transcript

Transcript of interview with Maddie

Interviewer: We are talking to Maddie about the ASMS and the Central Studies Interdisciplinary program and er, um, her recollections of the embedding of English into it and to see what you can remember.

Maddie: OK

Interviewer: OK. One thing I don't know is where you went to school and what kind of English experience you had before you went to the ASMS.

Maddie: Ah … very disjointed. For … I'll go backwards. Prior to the ASMS I was at the [name omitted] International High School for six month. Before that I was at [name omitted] High School in Victoria for four months. Prior to that, I was at [name omitted] High School in New South Wales for two years

Interviewer: My goodness, you've moved around.

Maddie: And, prior to that I was at [name omitted] Primary School for the entirety of my primary schooling years.

Interviewer: Yeah! So, can you talk a little bit about the kind of English curriculum experience you had, particularly the secondary I suppose, though the primary experience is also relevant.

Maddie: Ah, I suppose … I don't think that I had anything particularly structured. In high school it was really more of [being] provided a task and then given feedback. We were not necessarily provided guidelines or guidelines on grammar, punctuation or structure. It was basically you would produce a work piece and they would critique you on it. Um, that was fairly consistent at each High School I went to.

Interviewer: And, was it pretty much the English teacher with the English class?

Maddie: Yeah! Ah, that was it. You would have a single English teacher and that would be it.

Interviewer: I ask that question because it forms a nice backdrop to the different experience that you probably did have when you came to the ASMS, and, perhaps you could talk a little bit about how you [experienced English at the ASMS]… and this is inevitably going to spill over into the curriculum in general.

Maddie: Yeah! Yeah!

Interviewer: Was it interdisciplinary in nature though? Perhaps how different was it and maybe how difficult or easy was it to adjust to that?

Maddie: I think initially it was quite difficult to adjust to the integrated nature of the school and it probably took me a t least a year to get my thought processing around integration and cross-thinking and using what you learned in one area to highlight and enhance another, whereas, traditionally in other experiences there were individual set tasks – there would be no integration or there'd be no access to information from other classes to use in multiple tasks

Interviewer: I want to come back to that a bit later on because one of the things that is important in this study that I am doing is how much that was a preparation for post-school work or study and, um, what was perhaps most useful conventionally in one discipline and crossed over into another. I am just wondering how much you actually recall about the English part of that in that it was interdisciplinary.

Maddie: It was interdisciplinary, so, from my perspective, when we did English it wasn't really like doing English because you do science or you do maths or you do like a biology topic or something and you would have to, or in that case you would have to report or produce a piece of work and overlayed with that would be the communication and the details that underline English. So, you know, if you want to write effectively and you want to be a good communicator, in this discipline you have to have all the base knowledge in order to do that.

Interviewer: Mm!

194

Maddie: So, we did projects on Leonardo Da Vinci and on—(pause)—and we did, we chose novels and movies, like science fiction, and we would write about it from a science perspective.

Interviewer: Ah, see, that's interesting because it always seemed to me that it was the science curriculum or the science idea that was driving what was going on. Did you find that limiting as far as the English part? Er, or, I mean, maybe …

Maddie: I did find it a little limiting in terms of the number of writing techniques and communication methods I was exposed to because the method of communication for science was very direct and very analytical.

Interviewer: Yeah!

Maddie: It's very pathway oriented—it's A to B, not necessarily tangential, and so, I suppose the communication techniques were missing in that there was little divergence, um, yeah.

Interviewer: One of the driving principles, I guess, learning principles at the ASMS was inquiry and, er, I guess that translates into educational theory in terms of various other things but, er, that suggests that there is opportunity for choice, diversity in how you might report things and express your knowledge and so on, and, er, suggests that there should be a level of creativity. Do you think there was, er, that that [dimension] was there?

Maddie: I think there was a level of creativity. But, at the end of the day, the products that you are trying to produce at the end drives the outcomes, so, you, if you are given, you know, if you are going to write a report about this, or you are going to write an essay or you 're going to present in a particular way, it drives what you are actually going to research., and, in some ways, it's … I tried to pursue art in maths, as an example, and there are many occasions when I came up to, like, I did a report about Escher as an artist in terms of the mathematical theory that he used in his art without actually underpinning mathematical knowledge. The work produced is still very reflective of the scientific idea of providing your method's results etc. Having that structure, that set structure, of a

scientific methodology is ingrained. And, I think the repetition of that methodology limits the extent of creativity because using that one method, or, the science field accepts that method and therefore that's the one you continue to use, so, even though there's that opportunity to explore, it's frequently not taken because of the mind set that's already ingrained.

Interviewer: Mm! Mm! Was that particular to mathematics or was that something that you felt across the other Central Studies?

Maddie: (long pause) Um, potentially across all Central Studies—it—might just be the way I think as well, you know, a bit of bias.

Interviewer: One of central things—I have a cheat sheet here somewhere that refers to the Fertile Question—yeah, here we are and it also tells us what those Central Studies were. The Fertile Question was there and it was set up as part of the introduction to each Central Study and—people could explore around it. And, when it came to providing some kind of tentative answer to it and reporting back, it…

Maddie: …I think the journey was different for everyone, the journey of how you got to a particular point was different but the results that you tended to get were quite similar. Like, everyone's journey could be very different and that was great in terms of trying to find new ideas and thinking potentially outside of what you would normally do. The Fertile Question and the way that you'd [respond] … you'd provide hints but not necessarily the answer. That was great because you were given the opportunity to go on a different path, not necessarily the direct one – because, you could learn a tangent, but in the end you were always directed to the same point.

Interviewer: Yeah, OK! The presenting of those things [FQ findings] often was to the whole group. Was that useful in terms of expanding understanding or learning new…

Maddie: …I was always a terrible presenter and I was always a terrible public speaker, um, I think, for me, it was kind of nerve wracking because I have never had a strong linguistic style—I have never been a very good

verbal communicator. So, for me, it was quite stressful having that presentation idea at the end. So, I don't know if…

Interviewer: …In the long term, though, was it useful to have that experience, that opportunity to present that way? You know, in lots of conventional schools students don't have an opportunity to present at all.

Maddie: I think it was because it provides for immediate feedback. It provides a level of realism in terms of whether or not your ideas or thoughts or the way you have done something is realistic and if—it gives you an appreciation of other people's ideas because you can get that immediate feedback response and gaining suggestions like, 'Have you thought about this? 'So, it helps a lot with criticisms.

Interviewer: Yeah, I agree. I understand absolutely what you are saying there. That's why I used to go to Friendly Street and read my poems in public because you knew immediately whether something worked or not. And, I also got a lot of ideas from other people through their readings and people would come up afterwards and say 'That worked really well, I liked that' or, they wouldn't say anything at all and you'd think 'Oooh!' (shared laughter.) So, that's good.

One of the things that happened in the exploration of the Fertile Question, which was part of the Central Studies too, was collaboration, working in groups, and so on. Was that a better experience for you at the ASMS than perhaps elsewhere or was it different…?

Maddie: I found it much better at the ASMS. I found the difference between the collaboration I experienced at the ASMS both before I went there and afterwards, I found to be a bit of a shock. I found it a bit of a shock as to the level of communication differences which I experienced at ASMS which were of a fairly good quality in terms of being able to collaborate, discuss and negotiate. And. For me, to develop those relationships outside of that environment was difficult because I found learning to be very individualistic before I went there and afterwards at university.

Interviewer: Interesting point. Let's move on to that point before we come back to the curriculum stuff. Did you find maybe that the ASMS processes or the way

the curriculum was delivered was a bonus for you when you went to university? Did it impact on how you could deal with university life?

Maddie: It definitely impacted me. I think the shock of going back to a system which didn't have that level of communication and collaboration, for me, was very difficult. Um, I think I was potentially influenced by a few personal factors, but, for me, it was very difficult to go from a learning environment where everyone was willing to have a discussion, willing to think on a problem, communicate, come back in twenty minutes, whereas, at university, everyone is time selfish.

Interviewer: Yeah! Yeah!

Maddie: And, so, for me, it was difficult because I had developed this inquiry-based learning technique but when I got to university there was nothing that was able to provide support for that.

Interviewer: I know I have experienced that myself even though I'm only doing it part time—very isolated, very insulated—not even having an opportunity to have a discussion with anyone, even in the post-graduate study centre because everyone is focussed, so focussed on their work and they've got no time for it.

Maddie: Yes. At the ASMS everyone was sharing their ideas to the point where sometimes you'd have a conversation and you couldn't actually remember who came up with what at any one point in time because it was so collaborative, it was like a group-thought mentality.

Interviewer: Yeah!

Maddie: And, at university it was completely different. Everyone was singular and very individualistic in the result and even when you did group projects people only ever did their portion of work to get what they wanted out of it. Um, potentially that's because of individual results—that's what's measured.

Interviewer: Yeah, I appreciate that. You know, and part of the problem is that a lot of the people who teach at university are not trained teachers.

Maddie: No—I found that as difficult as well. Um, asking a question of some of the lecturers and then responding to it with exactly the same explanation—even if you asked multiple times the explanation didn't change in terms of the way that they provided it. They wouldn't change techniques; they wouldn't go from an oral [explanation] to drawing a picture or providing a demonstration. There were very few and the people/lecturers who did it very well had very good communication skills in terms of interpersonal communication as well has having a level of interest in whether or not their students were able to understand. I think the lecturers who really succeeded were the ones who engaged with their audience. They asked pointed questions and they didn't move on until someone answered it or they would pick on students or they'd ask to give an example of 'this' in real life. So, there was a level of engagement with some lecturers and just nothing at all with others.

Interviewer: Just one more thing about university life in relation to all of the influences of the ASMS. Did it give you the confidence to approach people—you know, at ASMS the people were there all the time, teachers were very available, you could drop in almost at any time.

Maddie: I would say no—there were so many differences between the people at the university and the people at the ASMS. When the teachers at the ASMS said, 'You can come and ask me a question at any point' they were genuine about it. And, I think when I first got to university I tried that out and it was made quite clear to me that undergraduate students were not a priority and if you could redirect your questions to somewhere else that's what was done.

Interviewer: Right.

Maddie: It was, 'Look up page blah, blah, blah.' Or, 'Do some more exercises.' It wasn't—

Interviewer: My wife was in the office of a lecturer at [Name] University recently and she saw that happen first hand. The student was summarily dismissed—most uncomfortable.

And now this allows me to get back to the English part of the curriculum since that is really what my emphasis is on. And the research stops at the start of the new SACE because the new SACE put in place changes about how the English part of the interdisciplinary program could be delivered. And I want to, for the first time ever, gather some of the evidence about what it was like to have English embedded in an interdisciplinary program.

Maddie: I really enjoyed it—I suppose because before I went there I didn't like writing reports—I did not like English full stop because to me it was just something boring. The topics chosen by my teachers weren't interesting, or, they were so mundane and unoriginal, or—

Interviewer: Mm! Write about your holiday.

Maddie: Yep! (shared laughter) Yes, it just wasn't something that I wanted to do, um—

Interviewer: So what was more engaging? What made it more engaging? Was it the interdisciplinarity, or was it the approach or the level of choice? What was it that made the difference?

Maddie: I think there was the level of choice— (long thoughtful pause)—possibly also that it gave a creative outlet to science.

Interviewer: Ah, really!

Maddie: Because when you learn something in an ordinary school you don't get to explore the history necessarily or, um, the interconnections between events in history and you don't get to have a look at how this could impact or how a particular scientific item could impact society as a whole. I think the level of choice and that, from the way the science was taught, allowed exploration and through that you got to communicate in a more vibrant manner in terms of the level of links that you could make between topics—and, that level of links kind of underpinned being able to communicate in terms of English items. It provided a richer source of material in order for you to be able to be expressive.

Interviewer: Right. It's interesting—[one of the specialist science teachers], now retired, indicated that she learnt a lot by working across the disciplines with other people from the Humanities. I certainly worked with people like D…. and there were others in the sciences from whom I learnt a lot, I must say. You were there probably at a time when some of the teachers were paired up to work together.

Maddie: Yes.

Interviewer: Was that effective? Was that useful/good?

Maddie: I found it useful in terms of perspective because one teacher would say one thing and one teacher would say another. It allowed you to gain an appreciation of the differences of points of view.

Interviewer: Right. Yeah, I mean, that's interesting because when I was working with D… and he was working on evolution timelines for the various ages of the development of our Earth, um, I guess I was dealing more with the English side of things and he was dealing more with the science. When I was taking more of the English components, he was dealing more with providing students advice about the content that could go into that. I found it wonderful team work actually—it doesn't happen as much like that anymore now.

Maddie: Yes, I think it also provides you with the inference about what ideas could be important to some people and what could be important to others and a direction to what the commonalities and differences are.

Interviewer: Even though you said previously that you weren't very conscious of English being English as such, were there any English-oriented activities that you recall/remember with fondness or that stick out in your mind.

Maddie: Um—I did a report on *Catch me if you can*. It was choose a book and movie…

Interviewer: Was that *Body in Question* where things were broken up into three areas, Immunology, and Physiology and Psychology?

Maddie: Yeah! (tentative)

201

Interviewer: It may have been one of those. Anyway, go on.

Maddie: Possibly, yes. There was that one—I found that kind of interesting, possibly because of the content and the way that [it was constructed— comparative text study]—it was interesting in terms of a mathematical way of seeing what this person actually did and how they rorted the system, and, interesting in terms of the different mediums to give an appreciation of what's possible in one communication method that is not possible in another. And, how you think about movies with regards to books, um, I suppose from that and from reading and watching *Harry Potter,* I see movies as a memory of the book. If a movie comes out when it's been a book, I don't expect it to be exactly like the book, I see it as a memory or a recollection.

Interviewer: That's interesting—I like that!

Maddie: Something that is a reminder—it's like a déjà vu moment where you get a smile, so, that kind of changed my perspective on how books and movies can be reflected—that was an interesting one.

Interviewer: Some of those texts were, I think we've already mentioned this—some of those texts were very specifically chosen because of the science focus, *Gattaca*—for instance.

Maddie: I didn't watch *Gattaca.*

Interviewer: You didn't, oh…

Maddie: No. I think I tried to watch *Bladerunner* or something like it.

Interviewer: That was more extreme science fiction.

Maddie: Yeah! I didn't really like it but I still remember what it's about.

Interviewer: Right! *Brooklyn Bridge* in Technological World— did you do that one?

Maddie: I did *Clockwork Orange.*

Interviewer: Oh, OK!

Maddie: I found that one disturbing.

Interviewer: Yes. Yes, so do I— still!

Maddie: Yes, ah!

Interviewer: Although these days people might regard it as rather mild I guess.

Maddie: I remember when we did an oral presentation on Leonardo da Vinci.

Interviewer: That was in Body in Question too I think. Did somebody from the university come down and do some art work, looking at faces and proportions and stuff. Did you do that as well?

Maddie: No, no. I remember a mathematics presentation that we went to once on the Foundations of Mathematics and it was a university person presenting a story about the progression of mathematics and numerals with regards to who came up with using letters and symbols representing numbers.

Interviewer: I'm trying to recall…I think in Sustainable Futures, one of the central English components was to do with poetry, um. One of the poems I do recall was that poem by Jimmy Morrison of *The Doors* about a man burning rubbish, or leaves, burning leaves.

Maddie: Yeah. I think we had to do poster presentations for Sustainable Futures. We did a forestry project. That was before you— my advice is that it was before you. It was the first year.

Interviewer: OK!

Maddie: What else did we do?

Interviewer: Yes, I came and went, I mean, I came and went and then I came back. (shared laughter)

Maddie: Yes! What else did we do? I don't know—most of it was so ingrained that— …

Interviewer: …it's hard to remember…

Maddie: …it's hard to remember particular items

Interviewer: Yeah! Thinking about the step from the Central Studies program to Year 12, was there an adequate preparation for Year 12. Are there things that could have been done better? Or, maybe more intensively?

Maddie: I would say no because the Central Studies were great in allowing that creativity to come out but they didn't highlight or they didn't allow for gaps to be realised where people were out with their communication skills. I don't think necessarily that—when I got to year 12 I thought I hadn't done grammar and punctuation for years and I don't think I've been marked on it. You'd get things back and you wouldn't get marks based on that. You got marks largely based on content and so when I got to Year 12, it was a bit of a shock for me re-practicing all of that, not just writing, but writing well.

Interviewer: Yeah! Well—interesting point. Possibly there was an assumption that by the time students got to Year 10 that all those basic fundamental things were there.

Maddie: Yeah!

Interviewer: And do you think that they were?

Maddie: No!—I think, fundamentally, in primary school and earlier high school, for my education it was not particularly formal, um—

Interviewer: So, you would say that there were gaps?

Maddie: There were really large gaps. It could have been because I moved schools but I still think they would have been there. I don't think—I think that the base knowledge that everyone had, everyone who went there [to ASMS] were either very gifted or very interested in science and maths so they usually had a bias towards that scale and so…

(interruption by member of the public)

…where were we? Ah, yes, gaps. I think everyone was biased towards an interest in science and mathematics. Previously, they were not interested in or could not have been interested in communication and with that kind of bias—if everyone there hated English before they got there, what's to say that they are going to be any good at it! Or that they

204

have been provided with that level of education. The number of backgrounds, the social and economic backgrounds, that everyone had at that school, were vast. For me, the people that did really well at English were the ones who had a really good education before. J……, who was in my class as well…

Interviewer: Mm!

Maddie: …she was very good. She had an excellent education before she got there and the differences between her and I were quite stark before the beginning of the year. I think I remember averaging 12 and 13s but she would get 20s and 19s all the time but by the end of the year I was closer towards her band of learning. And that was only because I went through the process of actually being interested in learning how to use all those techniques and taking on constructive feedback and sitting down [with the teacher]and saying, 'What's wrong here?'

Interviewer: That's interesting because one of the things that I'm also interested in is about the kinds of things that made a difference, you know, in the long run. And, maybe, well that's one of them obviously that you had that opportunity [to get help or advice]—but, were there other things perhaps that helped?

Maddie: (long thoughtful pause) I think, for me, a large part of going to the ASMS was having the social structure there and it wasn't really based around the English as such but it was being engaged in learning, not just going to school because that's what your obligation is.

Interviewer: So, there was an environment there that…

Maddie: Yeah!

Interviewer: What the French call a *milieu* or something.

Maddie: I don't know, from what I've heard from others, and some of the teachers, that that's not there anymore, or it's less.

Interviewer: I understand it's different, that it's much more structured, much more working in set groups, more of an accountability stamp on things.

Maddie:　　　Mm! When I got there, if you didn't do well, they would say that's your own fault, you've got all the resources, that's not my problem. If you want to learn, I'm here to help, otherwise, if you don't want to be here, go somewhere else.

Interviewer:　Was it useful to have resources up electronically—available in the way they were?

Maddie:　　　Yes, but I found when I was there they didn't have a library so not having that traditional resource made it difficult but I did find that having computers everywhere really did help in terms of getting information because if you had a question and someone couldn't answer it you could ask the computer.

Interviewer:　Yes! Ask Ms Google it. That's true. Just an aside here, currently I am back working with P……….

Maddie:　　　Really!

Interviewer:　Yes. She is my co-teacher teaching English in the Study Centre

Maddie:　　　She's a lot of fun.

Interviewer:　She is indeed—she's great. Anyway, that's really an aside. You mentioned the library—it was part of the university. Lots of teachers have come and gone at the ASMS and many have thought there ought to have been a library in the ASMS. What's your view about that?

Maddie:　　　I would say yes, I agree. I think, because of the nature of the building and the nature of the learning environment it's set up to be a single unit and having peripheral outcrops and things like that, you know, a library across the road or learning spaces on the top of the hill on the other part of the campus—it doesn't fit

Interviewer:　That's Earth Sciences etc.?...

Maddie:　　　Yeah! Earth Sciences—I don't think they have that anymore—they swapped with other classrooms across the road.

Interviewer:　Yes, they've got a classroom upstairs in the—[Sturt building].

Maddie:	Yes. It didn't fit, it didn't quite fit the mentality or the use of the building.
Interviewer:	Some of the students who completed some of their SACE units in Year 10 were able to negotiate, [Name omitted] was one of those, were able to negotiate to work with a mentor at [Flinders] University and perhaps by the time you were there that wasn't quite as available.
Maddie:	[Name?] He was in my year.
Interviewer:	He was in your year?
Maddie:	So it was him.
Interviewer:	I thought you were a year later.
Maddie:	No—he was in my Chemistry class.
Interviewer:	OK! So, he was one I think who had finished his English and perhaps a couple of other things in his Year 10 year, and in Year 11, he did work with mentors from the University.
Maddie:	I think, from my knowledge, it would have been if you had asked for that, that was a possibility.
Interviewer:	I thought that was great flexible aspect of the ASMS to be honest. And, I was sorry when for some reason or other that was not made available to others and now students in Year 10 are not permitted to be accruing SACE points.
Maddie:	Really! Because I found that really useful. If I had thought about it more I would have loved to have finished off some of my SACE units in Year 10 and do a subject of Year 12 or do a bit more in terms of prac time. Yeah. The people who got the opportunity to do Year 12 subject in Year 11 ended up doing really well.
Interviewer:	Yep! You are not alone in making that comment. I can tell you. It's a good observation. Part of the problem was the introduction of the new SACE which changed things a bit but—there you go.

Where are we up to in terms of my cues here now? Mm! One thing that I haven't picked up is the way in which the assessments were done and … |

the assessments were unusual in the sense that there was the interdisciplinary study, you did units and then you drew out components that were related to the SACE requirements. Even in mathematics there was an oral which was counted for English. Did that matter to you or was it just par for the course?

Maddie: I don't think it really bothered me at the time. I just thought OK, you know, instead of producing lots of tiny things I could produce one reasonably large thing and count it for multiple things. It was—I found it useful because I could produce something that I really felt proud of— like I felt that I had achieved something, um—

Interviewer: Which is what learning should be about.

Maddie: I found smaller tasks where you just get perhaps a credit for one thing frustrating sometimes because when you are doing smaller things, sometimes it seems like just ticking the boxes.

Interviewer: What about the assessment for the group work?

Maddie: I have always found group work difficult.

Interviewer: Yeah! Go on.

Maddie: It's so highly dependent on the social factor of the group, um, I don't think the level of management within a group is really recognised. Like, one person could have contributed less on paper than anyone else in the group but they actually got each one of those individuals talking, they might have brought together what everyone else's thoughts were and put it in there and actually made it a cohesive unit. And, the person who does that doesn't necessarily get the credit.

Interviewer: It's one of the things that P……….. and I were beginning to explore and then she moved to …………… That [inequity in the assessment of group work] is an issue but not an issue peculiar to the ASMS.

Maddie: No! It is peculiar to group work, full stop.

Interviewer: Yes! And how to do group work assessment in an appropriate and a fair way— it's not an easy thing and yet I believe that group work is really important—

Maddie: I think that group work is really important and in some ways allocating correction factors to individual people's portions of work is useful in terms of cutting out people who are going to skive off and use everyone else's efforts for their own benefit. But, I also think that a group should be able to kick those people out or to say, this is what our project is, if you're not going to work, then you are not going to be part of the project. It's a capitalist kind of mentality because if you are not going to provide what you say you are going to provide then we are not going to give you anything either.

Interviewer: One of the positive things that happened, and I think it happened when you were there, was the Nano Fair.

Maddie: Yeah!

Interviewer: You work as a group of three people.

Maddie: Yeah! I enjoyed that project— I thought it was really good.

Interviewer: In that way people took on specific roles and their assessment really related not only to the overall outcome but to the role that people had in the group.

Maddie: I think that's a really useful way to do it.

Interviewer: Tell me, what was your project?

Maddie: Um, maybe some kind of paint.

Interviewer: OK—interesting. I remember some of them.

Maddie: Colour changing paint or paint on solar cells or something. Funnily enough, one of my university er, actually my research supervisor in my final year, is working on nano-paints…

Interviewer: Is that right?

Maddie: …for solar power.

Interviewer: Well! There we go! One I do remember was a group doing—or, developing nanotubes to be built into a new kind of tyre which changed its profile according to the weather conditions. That was clever.

Maddie: That was clever. At the time I was so annoyed with people. At that stage I didn't think it was nanotechnology because my idea of a technology is repeatable results ending in a useful product that is definitive and the same every time in terms of engineering. And, science for me is the study and logical explanation of phenomena. For me, at that stage, nanotechnology was still at that science stage.

Interviewer: Embryonic!

Maddie: That's right—too embryonic to call it a technology. I was just annoyed at the time because, you know, it could be there but it's not there yet.

Interviewer: We need to note that it was called *Towards* Nanotechnology.

Maddie: I know! I know!

Interviewer: Another project that really sticks in my mind— I think it must have been part of Sustainable Futures—where, correct me if I am wrong and I may be wrong, where people were working in groups and they took on the role of a country and they had to go into a forum where—

Maddie: Yes! Yes! On climate change and they had to advocate for rights for Kiribati (??) and island nations v mainland China etc. I remember.

Interviewer: What are your thoughts about that?

Maddie: I thought it was really interesting in terms of that perspective again, of how your biases are going to impact what you argue for.

Interviewer: So if you look back on it now (I'm gob-smacked, and it has been really interesting to talk to you)—if you look back on it now, it sounds as though you have a very positive view overall. What are the things you think you really gained out of the experience of being there [ASMS]— not just English but the whole experience?

Maddie: The open mindedness, the idea or the prevalence of people not telling you what their expectations are at the beginning, um, allowing you to find your own way, um, providing you with stop posts or directions when you need them and letting you know that they're there. For me it was really an environmental condition that was very positive for me seeing how an environment could impact someone so heavily. Um – what else did I gain?

Interviewer: I think some of those things—

Maddie: I think an appreciation of what adults really mean and an appreciation of that teachers and students can be on a very similar learning plane.

Interviewer: Certainly that was true for me.

Maddie: Um!

Interviewer: Some of those things are the very reasons why I loved being there. As you said, it was that open learning environment, it was very constructivist, that focus on inquiry was intentional—it was there, there was an underlying respect for learning even though there was a lot of fun and even though—people behaved with mischievous behaviour from time to time there was nothing sinister about that. It was just a lovely learning community operating in the place and I really loved being there. I enjoyed that and I loved the fact that there was that open exchange between students and staff, the access was there, the resources were there.

                NOTE: Scattered notes of agreement from Maddie throughout this summary/overview.

Maddie: There was also a lack of the tall poppy—, that is, of people trying to cut down the tall poppy and try and win an argument. It wasn't ever necessary to win an argument there. It was necessary to participate in the conversation that was being had.

Interviewer: In spite of that there are probably things, particularly from an English point of view, that we could have done better.

Maddie: I think so too. I think from an English point of view in the early years there wasn't enough constructive feedback on communication methods. There wasn't enough in terms of, 'If this was your outcome, where do I go from here?' I think learning English communication skills were limited by what you got from the beginning or what you had at the beginning because the learning outcomes were directed towards the content and not the necessarily the method—whereas, the method might have helped the content. There wasn't enough feedback on communicating well. On—it was largely about content in the early years of the school.

Interviewer: And I think there was an assumption that, you know, if you had to write a science report well, the science teacher did that or whatever and I'm not sure that the demonstration of what was an appropriate form for the purpose was done.

Maddie: Yeah! That was not done. Everyone would do a different thing for a science report. There wasn't—you weren't given a template as such or—

Interviewer: —a model.

Maddie: Yeah! You weren't taught— you were taught a little bit about the use of language and what kind of tense and third person, first, second, that you would use for different kinds of writing but there wasn't an emphasis on providing examples and catching people and correcting and directing people towards the ultimate method that's usually accepted. For a science report you'd just I did this, I did that, and that would be OK at that level but—

Interviewer: … it wasn't writing for an academic purpose quite …

Maddie: No! It wasn't and I think that the communication techniques you use for talking to a group situation weren't—the idea of targeting your writing towards a particular audience wasn't communicated.

Interviewer: I've just had a little peek here and we have been talking for almost an hour and it's been absolutely fascinating. But I promised I wouldn't keep you more than an hour talking about this. There's a wealth of information that you have given me here, fantastic.

Maddie: Are there any extra items on your notes.

Interviewer: Well, really something about overall satisfaction and basically, I suppose, would you recommend such a place to others?

Maddie: I would highly recommend the ASMS as a place to learn. I would say there is a footnote to that and that is that the rest of the world is not like there.

Interviewer: No! And with the change of government maybe—

Maddie: —less so. (shared laughter) I'd say it breeds idealism and open communication in the workplace and at university it wasn't always appreciated.

Interviewer: I know exactly what you are saying there. And it is true and it's one of the reasons why I guess that when I went to [Name omitted] College for that one year I desperately wanted to return to the ASMS because suddenly, although I really liked the students, I just did not like that competitive, commercial or box-like kind of process—

Maddie: —the military hierarchical kind of structure—

Interviewer: Exactly. I just yearned for that openness, that integration—

Maddie: —to be able to say what you think—

Interviewer: Yes! That's right and not have any fear of retribution or being punished for it—just open in that way. But I've just cut across you now!

Maddie: It's OK. Yeah! I've learnt a lot since then—open communication isn't always going to work for you and language in communication can be skilfully used in manipulation—or trying to get around the hierarchal competitive nature of using collective terms instead of individualistic terms in trying to get past the individualistic nature of work and university.

Interviewer: It was science-oriented, it was mathematics-oriented, but nevertheless there was history, geography, philosophy—that town planning in Towards Nanotechnology involving the setting up a nano-factory—and

all the ethical debates surrounding that was a fabulous—[example of interdisciplinarity.]

Maddie: Was it *Prey* the Nano book?

Interviewer: Yes—that was right—Michael Crichton.

Maddie: Yeah!

Interviewer: So, there are lots of little residual things that have obviously had an impact on your life and it's because you had that opportunity there.

Maddie: Yeah! I don't think I would appreciate how much communication can make a difference

Interviewer: I think we should end this on that note because that is so positive and optimistic. Thank you! Thank you for that! And look at that, exactly 60 minutes and 30 seconds.

<div align="right">24/3/2014</div>

REFERENCES

Agee, J. (2000). Theory, identity, and practice: A study of two high school English teachers' literature instruction. *Report 13003*. National Research Centre on English Learning and Achievement. NY: University of Albany.

Andrews, M. (2012). Learning from stories, stories of learning. In I. Goodson & A. M. Loveless, *Explorations in narrative research,* (pp. 33–44). Rotterdam, Netherlands: Sense Publishers.

Applebee, A. N. (1994). Toward Thoughtful Curriculum: Fostering Discipline-Based Conversation. *The English Journal*, *83*(3), 45–52. Republished March 1997: *Report 1.10*, National Research Centre on English Learning and Achievement. NY: University of Albany. Available from http://cela.albany.edu/reports/thought/index.html

Australian Association for the Teaching of English. (2009). *Response to the National English Curriculum: Framing Paper from AATE Council,* 1–19. Australia: AATE.

ASMS. (2002). *Projects: the Australian Science and Mathematics School.* Flinders University: South Australia.

ASMS. (2004, 2005, 2006, 2007, 2008, 2009) *Annual Report*. Retrieved from http://www.asms.sa.edu.au/schoolinfo/documents/

ASMS. (2009). *Context Statement*: 2009. Retrieved from http://www.asms.sa.edu/schoolinfo/Documents/School%20Context%20Statement%202009.pdf

ASMS. (2011a). *Context Statement: 2011.* Flinders University Campus: ASMS. (Reproduced Appendix 1).

ASMS. (2011b). *Enrolment Information*. Retrieved from http://www.asms.sa.edu.au/schoolinfo/Pages/Enrollment.aspx

ASMS. (2011c). *Learning Principles*. Retrieved from http://www.asms.sa.edu.au/curric/learning/Pages/Learning Programs.aspx

ASMS. (2011d). *Learning for Success*. Unpublished conference notes: ASMS archives.

Bakhtin, M. (1981). *The Dialogic Imagination* (Emerson, C., & Holquist, M. Trans.). Austin, Texas: University of Texas Press.

Barab, S. A., & Landa, A. (1997). Designing effective interdisciplinary anchors. *Educational leadership, 54*(6), 52–55.

Becher, T. (1989). *Academic Tribes and Territories: Intellectual enquiry and cultures of discipline.* Milton Keynes: SRHE/Open University Press.

Bernstein, B. (1971). On the classification and framing of educational knowledge. *Knowledge and control*, *3*, 245–270.

Bloom, B. S. (1958). Ideas, problems, and methods of inquiry. *The integration of educational experiences*, *57*, 84–104.

Boomer, G. (1992). Ch. 20: Negotiating the curriculum reformulated. In Boomer, G. *Negotiating the curriculum: Educating for the 21st century* (pp. 276–289). UK: The Falmer Press

Bogard, C. J. (2003). Explaining Social Problems: Addressing the Whys of Social Constructionism. In J. A. Holstein, & G. Miller, (2003). *Challenges & Choices: Constructionist Perspectives on Social Problems* (pp. 209–235). NY: Aldine de Gruyter.

Brophy, J., & Alleman, J. (1991). A caveat: Curriculum integration isn't always a good idea. *Educational Leadership*, *49*(2), 66.

Brown, T., & Jones, L. (2001). *Action research and postmodernism*. Buckingham, UK: Open University Press.

Bruner, J. S. (1966). *Towards a Theory of learning*. MA: Harvard University Press.

Bruner, J. S. (1986). *Actual Minds: Possible Worlds.* Cambridge, MA: Harvard University Press.

Burns, R. C., & Sattes, B. D. (1995). *Dissolving the Boundaries: Planning for Curriculum Integration in Middle and Secondary Schools [and] Facilitator's Guide*. Charleston, WV: Appalachia Educational Laboratory (Available ERIC: ED384455).

Canning, J. (2004). *Interdisciplinary Teaching and Learning in Area Studies*. Centre for Languages, Linguistics and Area Studies. Retrieved from http://www.llas.ac.uk/resources/paper/2134

Caine, R. N., & Caine, G. (1991). *Making Connections: Teaching and the Human Brain*. Alexandria, VA: Association for Supervision and Curriculum Development (Available ERIC ED 335141).

Checkland, P., & Holwell, S. (1998). Action Research: Its nature and validity. *Systemic Practice and Action Research*, *11*(1), 9–21.

Clandinin, D. J., & Connelly, F. M. (2000). *Narrative inquiry: Experience and story in qualitative inquiry*. San Francisco: Jossey-Boss Publishers.

Clandinin, D. J., Pushor, D., & Orr, M. (2007). Navigating sites for narrative inquiry. *Journal of Teacher Education*, *58*(1), 21–35.

Clandinin, D.J., & Rosiek, J. (2006). Mapping a landscape of narrative inquiry: Borderland spaces and tensions. In D. J. Clandinin (Ed.), *Handbook of Narrative Inquiry: Mapping a Methodology*, (pp. 34–76).Thousand Oaks, CA: SAGE.

Cliff, C., & Miller, S. (1997). Multicultural Dialogue in Literature and History Classes: The dance of creative and critical thinking. CELA. Retrieved from http://cela.albany.edu/reports/dialogue/index.html

Connelly, F.M., & Clandinin, D.J. (1990). Stories of Experience and Narrative Inquiry. *Educational Research*, *19*(5), 2–14.

Cormack, P., Grant, P., Kerin, R., & Green, B. (2003). Filling in the historical gap: Post-primary English curriculum in South Australia – from the 1920s to the 1950s. *English in Australia*, *136*, 67–78.

Creswell, J.W. (2007). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: SAGE.

Creswell, J. W. (2008). *Educational Research: Planning, conducting, and evaluating quantitative and qualitative research*, (3rd ed.) Upper Saddle River, NJ: Pearson.

Creswell, J.W. (2009). *Research Design: Qualitative, quantitative and mixed methods approaches*. Thousand Oaks, CA: SAGE.

Crotty, M. (1998). *The Foundations of Social Research: Meaning and Perspectives in the Research process*. Australia: Allen & Unwin.

Cumming, J., Kimber, K., & Wyatt-Smith, C. (2012). Enacting policy, curriculum and teacher conceptualisations of multimodal literacy and English in assessment and accountability. *English in Australia*, *47*(1), 9–18.

Davis, N., & O'Reilly, T. (2012). *Advancing Literacy within an Interdisciplinary Curriculum at the ASMS*, DVD. South Australian Department of Education and Children's Services, CRICOS Provider No. 00018A.

Davis, N. & O'Reilly, T. (2010). *Scientific Literacy and the ASMS: Towards Improving Pedagogy in Senior Secondary Classrooms.* ASMS Archives. (Rev. ed. available 2012).

Department of Education and Children's Services. (DECS). (1996). Curriculum Integration. *Curriculum Digest Resource Paper.* South Australia: DECS.

Dean, W. (1996). Integrative Education. *ERIC Digest*, *101*. (Available ERIC: ED390112).

Denzin, N. K., & Lincoln, Y.S. (Eds.). (2008). *Handbook of Qualitative Research.* Thousand Oaks, CA: SAGE.

Dewey, J. (1933). *How we think*. Lexington, MA: D.C. Heath & Co.

de Vaus, D. (2001). *Research Design in Social Research*. London: SAGE.

Dixon, J. (1967). *Growth through English*. UK: OUP.

Down, D. W. (2006). Free-choice personal inquiries for Science, Physical Education and Mathematics in Years 3–9. *SASTA Journal*, *1,* 10–13.

Dweck, C. S. (2000). *Self-Theories: Their Role in Motivation, Personality, and Development*. Philadelphia: Taylor & Francis.

Dwyer, B. (1995). Preparing for the 21st Century: A paradigm for our times. *Innovations in Education and Training International*, *32*(3), 269–277.

Eisner, E.W., (2017). *The Enlightened Eye: Qualitative Inquiry and the Enhancement of Educational Practice*. NY: Teachers College Press.

Fischer, G. (2003). Design, Design Communities, and Knowledge Management: Why Learning from the Past is not Enough! Conference Presentation, *IKNOW'03.Graz, July 2003*. Center for Lifelong Learning and Design: University of Colorado at Boulder. Retrieved from http://www.l3d.cscolrado.edu/~gerhard/presentations/slides-graz-final.pdf

Flick, U. (2006). Ch. 14: Narratives. In U. Flick, *An Introduction to Qualitative Research*, (3rd ed.), 172–188. London: SAGE.

Fogarty, R. (1991). *The Mindful School: How to Integrate the Curricula.* Palatine, IL: Skylight Publishing, Inc.

Friere, P. (1970). *Pedagogy of the Oppressed.* N.Y: The Seabury Press*.*

Gardner, H. (1983). *Frames of Mind: The theory of multiple intelligences*. NY: Basic Books.

Gardner, H. (1993). *Multiple Intelligences: New horizons in theory and practice*. NY: Basic Books.

Gardner, H. (2000). *The Disciplined Mind: Beyond Facts and Standardised Tests, The K–12 Education that Every Child Deserves*. NY: Penguin/Putnam.

Gardner, H. (2006) *Multiple Intelligences* (Rev. ed.). NY: Basic Books.

Gardner, H. & Boix-Mansilla, V. (1994). Teaching for understanding within and across the disciplines. *Educational Leadership, 51*(5), 14–18.

Gardner, H., Perkins, D., & Perrone, V. (2005). *Teaching for Understanding*. Project Zero, Harvard University.

Geertz, C. (1973). Ch. 1: Thick Description: Toward an Interpretive Theory of Culture. In C. Geertz, *The Interpretation of Cultures: Selected Essays,* (pp. 3–31). NY: Basic Books.

Ghanbari, S. (2015). Learning Across the Disciplines: A Collective Case Study of Two University Programs that Integrate the Arts with STEM. *International Journal of Education & the Arts, 16*(7). Retrieved from http://www.ijea.org/v16n7/

Goodson, I. F. (2012). Investigating narrativity: An introductory talk by Ivor Goodson. In, J. F. Goodson, A. M. Loveless, & D. Stephens (Eds.). *Explorations in narrative research* (pp. 1–10). Rotterdam, Netherlands: Sense Press.

Green, B. (2008). English, Rhetoric, Democracy: or, Renewing English in Australia. *English in Australia*, *43*(3), 35–44.

Grossman, P. L., & Stodolsky, S. S. (1995). Content as context: The role of school subjects in secondary school teaching. *Educational Researcher*, *24*(8), 5–23.

Hargreaves, A., Earl, L., Moore, S., & Manning, S. (2001). Ch. 4: Curriculum Integration, In A. Hargreaves et.al., *Learning to Change: Teaching beyond subjects and standards* (pp. 83–112). CVA: Jossey-Bass.

Hargreaves, A., & Fullan, M. (1998). *What's worth fighting for out there*? Australia: ACEA.

Harpaz, Y. (2003). Teaching and Learning in a Community of Thinking. *Conference Paper to the Learning to Learn Conference*. Adelaide: Australia. Retrieved from http://www.learningtolearn.sa.edu.au/Colleagues/files/links/Teaching_and_Learning_in_a_community_of_thinking.doc

Harpaz, Y. (2005). Teaching and Learning in a Community of Thinking [Conference Paper, 2003]. *Journal of Curriculum and Supervision*. 20(2), 136—157

Harpaz, Y., & Leftstein, A. (2000). The Science of Learning: Communities of Thinkers, *Educational Leadership*, *58*(3), 54–57.

Harste, J. (2003). What do we mean by literacy now? *Voices from the Middle*, *10*(3), 8–12.

Harvard University. (2002). Harvard University Project Zero. Reports retrieved from http://www.pz.harvard.edu/who-we-are/about

Hein, G. (1991). Constructivist learning theory. *Institute for Inquiry*. Retrieved from http://www.exploratorium.edu/ifi/resources/constructivistlearning.htmlS

Hesse-Biber, S. N., & Leavy, P. (2011). *The practice of qualitative research*, (2nd ed). Thousand Oaks, CA: SAGE.

Homer, D. (2007). Circling around 'Cultural Heritage' and the English Curriculum in 2007. *English in Australia*, *42*(2), 17–33.

Howard. J. (1995). Critical Issue: Working Toward student self-direction and personal efficacy as educational goals. Retrieved from http://www.ncrel.org/sdrs/areas/issues/students/learning/lr200.htm

Jacobs, H. H. (Ed.). (1989). Ch. 1, The growing need for interdisciplinary content. *Interdisciplinary Curriculum: Design and Implementation,* 1–12. Alexandria, VA: Association for Supervision and Curriculum Development. (Available ERIC: ED316506).

Jacobs, H. (1991). Advancing the Social Sciences through the Interdisciplinary Enterprise. *The Social Science Journal, 8*(21), 1–14.

Jacobs, H.H. (Ed.) (1998). *Interdisciplinary Curriculum: Design & Implementation*, Alexandria, VA: Association for Supervision & Curriculum Development.

Jacobs, H. H. (2004). Interdisciplinary Learning in Your Classroom. *Workshop Report*. Educational Broadcasting Corporation. Retrieved from http://www.thirteen.org/edonline/concept2class/interdisciplinary/index.html

Jolly, E. (2010). *Challenging the Divide: Approaches to Poetry and Science*. Adelaide, South Australia: Lythrum Press.

Josselson, R. (2006). Narrative research and the challenge of accumulated knowledge. *Narrative Inquiry*, *16*(1), 3–10.

Kain, D. L. (1993). Cabbages and kings: Research directions in integrated/interdisciplinary curriculum. *The Journal of Educational Thought, 27*(3), 312–331.

Knapp, C. E. (1996). Just Beyond the Classroom: Community Adventures for Interdisciplinary Learning. ERIC Clearinghouse. (Available ERIC: ED35325–1348).

Klein, J. T. (1996). *Crossing boundaries: Knowledge, disciplinarities, and interdisciplinarities*. VA: University of Virginia Press.

Klein, J. T., & Doty, W. G. (1994). *Interdisciplinary studies today*. San Francisco, CA: Jossey-Bass.

Kockelmanns, J. J. (1979). Science and discipline: Some historical and critical reflections. In J. J. Kockelmanns, (Ed.) *Interdisciplinarity and higher education* (pp. 11–45). PA: Pennsylvania State University Press.

Kress, G. (2006). Reimagining English: Curriculum, Identity and Productive Futures. In B. Doecke, M. Howie, & W. Sawyer (Eds.) *Only Connect: English teaching, schooling and community* (pp.31–41). South Australia: Wakefield Press

Krishnan, A. (2009). What are Academic Disciplines? Some observations on the Disciplinarity v Interdisciplinarity Debate. *NCRM Working Papers*, 1–57. ESRC National Centre for Research Methods: University of Southampton. Retrieved from http://eprints.ncrm.ac.uk

Lake, K. (2001). Integrated Curriculum. *School Improvement Research Series (pp.1-22).* Portland: OR: Northwest Regional Education Laboratory. Retrieved from http://www.nwrel.org/scpd/sirs/8/c0126.html

Langer, J. A., Confer, C., & Sawyer, M. (1993). Teaching Disciplinary Thinking in Academic Coursework. *National Research Centre on Literature Teaching and Learning Report Series*, *2* (10). Reprint 1996 available National Research Center on English Learning & Achievement. Retrieved from http://cela.albany.edu/reports/discthink/index.html

Larkin, J. (2001). A Brilliant Light on the Learning Landscape. *Spotlight*, *4*(8), 1–29

Laslett, A. D. (2004). ASMS Students and Literacy Needs. *Research Report presented to ASMS Staff, 17th May, 2005*. ASMS Archives.

Lattuca, L. R. (2001). *Creating interdisciplinarity: Interdisciplinarity research and teaching among college and university faculty*. Nashville: Vanderbilt University Press.

Lawrence, S. (2010). In E. Jolly (2015). *Making a Stand,* (pp.198 –202). South Australia: Wakefield Press.

Lawrence-Lightfoot, S. (2005). Reflections of Portraiture: A Dialogue Between the Arts and Science. *Qualitative Inquiry*, *11*(1), 3–15.

Lawton, E. (1994). Integrating curriculum: A slow but positive process. *Schools in the Middle, 4* (2), 27–30. ERIC Clearinghouse. (Available ERIC: EJ492890)

Lincoln, Y.S., & Guba, E. (1985). *Naturalistic Inquiry*. Beverley Hills, CA: SAGE.

Lipson, M., Valencia, S., Wixson, K., & Peters, C. (1993). Integration and thematic teaching: Integration to improve teaching and learning. *Language Arts*, *70* (4), 252–263.

Loepp, F. L. (1999). Models of Curriculum Integration. *Journal of Technology Studies, 25* (2), 21–25.

Marshall, J. (2001). Self-reflective inquiry practices. In P. Reason, & H. Bradbury (Eds.) *Handbook of Action Research:*

Participative Inquiry and Practice, (1st ed.), (pp.433–439). Thousand Oaks, CA: SAGE.

Marzano, R. J. (1991). Fostering thinking across the curriculum through knowledge restructuring. *Journal of Reading*, *34*(7), 518–525.

Maslow, A. (1970). *Motivation & Personality,* (Rev. ed.) NY: Harper & Row.

Maslow, A. (1965). The need for creative people. *Personnel Administration*, *28*, 3–22.

Maslow, A. (1943). A theory of human motivation. *Psychological Review*, *50*, 370–396.

Mathison, S. & Freeman, M. (1998). The logic of interdisciplinary studies. *Report Series 2.33(11004).* The Centre on English Learning and Achievement (CELA): University of Albany, 1–25. Retrieved from http://cela.albany.edu/logic/index.html

Mautner, T. (2005). *Dictionary of Philosophy*, UK: Penguin

Merriam, S. B. (1998). *Qualitative Research and Case Study Applications In Education*. San Francisco: Jossey-Boss.

Metcalfe, A., & Game, A. (2006). *Teachers Who Change Lives*. Australia: Melbourne University Press.

Misson, R. (2005). The origin of literacies: How the fittest will survive. *English in Australia*, *142* (Autumn)*,* 37–49.

Misson, R. (2012). Understanding about water in liquid modernity: Critical imperatives for English teaching. *English in Australia*, *47*(1) pp.27–35.

Morse, M. L. (2008). Under the big top: Using the Hartford circus fire of 1944 to teach literacy strategies to Connecticut's content area teachers. *Journal of Adolescent & Adult Literacy*, *52*(4), 296–307.

Newell, W. H. (Ed.). (1998). *Interdisciplinarity: Essays from the literature.* NY: College Board.

Nikitina, S. (2002). Three Strategies for Interdisciplinary Teaching: Contextualizing, Conceptualizing, and Problem-Solving. *Interdisciplinary Studies.* Project Zero: Harvard Graduate School of Education.

Oberholzer, E. E. (1937). *An integrated curriculum in practice*. NY: AMS Press.

O'Brien, R. (1998). An overview of the methodological approach of action research. *Action Research Methodology Course Notes*. Retrieved from http://www.web.net/~robrien/papers/xx%20ar%20final.htm

OECD/CERI. (2011). *Innovative Learning Environments Inventory Case Study: Australian Science and Mathematics School*. OECD/CERI. Retrieved from http://www.innovations.sa.edu.au/files/limks/Australian_Science_and_MathematicsSchool.pdf

Oliver, G. & Davies, J. (2004). Building for Radical Innovation. *Andypshots, 1*(4), (pp.1–5).

O'Reilly, T., & and Laslett, A. D. (2010). Literacy at ASMS. *Action Research Report*. ASMS Archives.

Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods*. (3rd ed.) Thousand Oaks, CA: SAGE.

Perkins, D. (1993). Teaching for Understanding, *American Educator: The Professional Journal of the American Federation of Teachers, 17*(3), 1—20. Retrieved from https://www.ghaea.org/files/IowaCoreCuriculum/Module2/Teaching_for_Understanding_Perkins_article.pdf

Phillips, C. (2002). *Socrates Café: A Fresh Taste of Philosophy*. NY: W. W. Norton Company.

Piaget, J. (1952). *The Origin of Intelligence in Children*. NY: International University Press Inc.

Piaget, J. (1973). *The child and reality: Problems of genetic psychology*. (Arnold Rosin, Trans.). Oxford, UK: Grossman.

Pike, M, A. (2002). Action research for English teaching: ideology, pedagogy and personal growth. *Educational Action Research, 10*(1), 27–44.

Pope, R. (2002). *The English Studies Book: An introduction to language, literature and culture* (2nd ed.) London & New York: Routledge.

Ritter, N. (1999). Teaching Interdisciplinary Thematic Units in Language Arts. *Digest, 142*. ERIC Clearinghouse.

Rogers, C., & Freiberg, H. J. (1994). *Freedom to learn*, third edition. Columbus, OH: Merrill-MacMillan.

Rossman, G. B., & Rallis, S. F. (1998). *Learning in the field: An introduction to qualitative research* (2nd ed.) Thousand Oaks, CA: SAGE.

Ryan, L. (2016). 12 Qualities employers look for when they're hiring. *Forbes Magazine*. Retrieved from http://www.forbes.com

Sara, J. (2004). The Central Studies at ASMS, *Conference Presentation 2005.* ASMS Archives.

Sawyer, W. (2007). The powerfully literate citizen. *English in Australia, 42*(2), 44–27.

Schubert, B. (1993). Literacy – What makes it real: Integrated, thematic teaching. *Social Studies Review, 32*(2), 7–16.

Schubert, M., & Melnick, S. (1997). The arts in curriculum integration. ERIC Clearinghouse (Available: ERIC ED424151)

Schwandt, T. A. (2000). Interpretivism, Hermeneutics & Social Construction. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research*, 189–213. Thousand Oaks, CA: SAGE.

Searle, C. (1999). *The Quality of Quantitative Research.* London: SAGE.

SERC-Carleton. (2017). *Why Teach with an Interdisciplinary Approach?* Retrieved from https://serc.carleton.edu/econ/interdisciplinary/why.html

Shanahan, T., & Shanahan, C. (2008). Teaching Disciplinary Literacy to Adolescents: Rethinking Content-Area Literacy. *Harvard Educational Review*, *78*(1), 40–59.

Shor, I. (1999). What is critical literacy? *Journal of Pedagogy, Pluralism & Practice*, *1*(4), 1–26. Retrieved from http://www.lesley.edu/journals/jppp/4/shor.html

Shor, I., & Friere, P. (1987). *A Pedagogy for Liberation: Dialogues and Transforming Education*. Westport, CT: Greenwood Publishing Group.

Simons, H. (2009). *Case study research in practice*. London: SAGE.

Somekh, B., & Lewin, C. (Eds.), (2006). *Research Methods in the Social Sciences*. Thousand Oaks, CA: SAGE.

Smith, B. (2007). The state of the art in narrative inquiry: Some reflections. *Narrative Inquiry*, *17*(2), 391–398.

Stake, R.E. (1995). *The art of case study research*. Thousand Oaks, CA: SAGE.

Stake, R. E. *(*2000)*.* Case Studies. In N. K. Denzin and Y. S. Lincoln (Eds.), *Handbook of Qualitative Research. (pp.* 435–455). Thousand Oaks, CA: SAGE.

Strubbe, M. A. (1990). Are interdisciplinary units worthwhile? Ask students? *Middle School Journal*, *21*(3), 36–38.

Taber, K. S. (2011). Constructivism as educational theory: Contingency in learning, and optimally guided instruction. In J. Hassaskhah (Ed.). *Educational Theory*, 39–61. NY: Nova. Retrieved from https://camtools.cam.ac.uk/wiki/eclipse/Constructivism.html

Tasmanian Government (2016). Qualities employers are looking for in employees. Department of State Growth: Government of Tasmania. Retrieved from http://www.skills.tas.gov.au

Thomas, G. (2011). *How to do your case study: A guide for students and researchers.* London: SAGE.

Thomson, P. (2002). *Schooling the rust belt kids.* Australia: Allen & Unwin.

Thompson, R.J. (Jr.). (n.d.). *News: Point of view, Arts & Sciences and Trinity College: Duke University.* Retrieved from http://www.aas.duke.edu/news/pov/thompson.php

Tompkins, G.E. (2010). *Literacy for the 21st century: A balanced approach,* (5th ed.) Boston: Allyn & Bacon.

Trahar, S. (2009). Introduction: The contribution of narrative research to comparative and international education: an editor's story. In S. Trahar (Ed.) (2009), *Narrative research on learning: Comparative and international perspectives*, 13–23. UK: Symposium Books.

University of Toronto. (2004). *Companion Paper 3 – Enabling Interdisciplinary teaching and Research.* University of Toronto: Office of the Vice President and Provost. Retrieved from http://www.provost.utoronto.ca/userfiles/page_attachments/library/6/3049_912705_Companion3.pdf

Vars, G. F. (1991). Integrated curriculum in historical perspective. *Educational Leadership, 49*(2), 14–15.

Vygotsky, L. S. (1962). *Thought and Language.* Massachusetts: MIT Press.

Vygotsky, L. S. (1978). Interaction Between Learning and Development. From *Mind in Society*, Cambridge, Maine: Harvard UP. Reprinted in: M. Gauvain, & M. Cole (Eds.) (1997). *Readings on the Development of Children*. NY: W. H. Freeman and Company.

Walker, K.E. (1996). *Improving the learning and teaching of environmental education in the primary school curriculum: a problem-based approach* (Thesis). Sydney: University of Technology.

Walsh, C. (2006). Beyond the workshop: Doing multiliteracies with adolescents. *English in Australia*, *41*(3), 49–57.

Webster, L., & Mertova, P. (2007). *Using narrative inquiry as a research method: An Introduction to using critical event analysis in research relating to learning and teaching.* London & New York: Routledge.

Willis, S (1994). Teaching across the disciplines: Interest remains high despite concerns over coverage. *ASCD Update*, *49*(2), 3–4.

Winch, J. (2007). Critical literacy and the politics of English teaching in the 21st century. *English in Australia*, *42*(1), 49–55.

Yin, R. K. (2003). *Case study research: design and methods,* (3rd ed.) Thousand Oaks, CA: SAGE.

Yin, R. K. (2004). *The Case Study Anthology*. Thousand Oaks, CA: SAGE.

Yorks, P., & Follo, E. (1993). Engagement rates during thematic and tradition instruction. ERIC Clearinghouse. (Available ERIC: ED363412). Retrieved from http://www.fikles.eric.ed.gov/fulltext/ED363412.pdf