Differences between Australian and Finnish student dispositions towards learning and links with performance

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Abstract

This study arose from questions surrounding the performances of school students in Australia and Finland in international comparative studies and the factors that contribute to the differences between these two countries. Specifically, investigation into student dispositions towards learning in Australia and Finland was pursued. Although Finnish students have consistently taken the lead in international academic comparative studies, this project found that as a group their dispositions towards learning are not necessarily more positive than those belonging to Australian students. Using the extensive datasets from OECD’s 2000, 2003 and 2006 PISA studies, this project selected items that were specific to student dispositions and conducted quantitative statistical analysis to unearth posited information regarding student dispositions and performance. Research results found that within each country, increasingly positive dispositions were related to improved performance. However, when student dispositions towards learning in Australia and Finland were compared, more positive dispositions did not always equate to higher performance. This project examined these differences and the disparities between the students’ dispositions and performance levels to find the crucial importance of cultural capital in the home and school environments. Accordingly, suggestions for improving Australian student performance and recommendations for further research were made with strong reference to the need to raise cultural capital in Australia.
Declaration of originality

This paper is the original work of the author and does not contain material that has been previously published or written other than where due reference has been given within the text.

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Alison Willis
Acknowledgements

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ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACER</td>
<td>Australian Council for Educational Research</td>
</tr>
<tr>
<td>ANOVA</td>
<td>Analysis of variance</td>
</tr>
<tr>
<td>CCCQ</td>
<td>Cross Curricular Competencies Questionnaire (administered in PISA 2000)</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
</tr>
<tr>
<td>PISA</td>
<td>Programme for International Student Assessment</td>
</tr>
<tr>
<td>SES</td>
<td>Socio-economic status</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organisation</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>WLE</td>
<td>Weighted likelihood estimate</td>
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</table>

Style.

This thesis has been prepared using a modified version of the APA style, with reference to the *Publication Manual of the American Psychological Association (Fifth edition).*
1.0 RESEARCH CONTEXT, PROBLEM AND QUESTION

1.1 Introduction

In this age of international comparative studies and an apparent obsession with the measurement of educational performances, it would seem that education commentators, academics and policy makers alike are constantly on the lookout for exemplars of best practice (Ball, 2008; Donnelly, 2004). Amid this milieu of striving for educational excellence the international spotlight has turned to the Finnish success. Finnish students have taken the lead in three consecutive international comparative studies conducted by the Organisation for Economic Cooperation and Development (OECD). The OECD’s Programme for International Student Assessment (PISA) has provided researchers with datasets of student performance standards from across the world of unprecedented size and detail, with 57 countries participating in the most recent round. Not surprisingly then, the academic prowess of Finnish school students has become topical in press, politics and publications and Finnish academics have seized the opportunity to explicate their success (Lie, Linnakylä, & Roe, 2003; Linnakylä, 2007; Välijärvi, Linnakylä, Kupari, Reinikainen & Arffman, 2002). Australian commentators have also been keen to publicise Australian student results, which are above the OECD averages, often comparing our strengths and weaknesses to the Finnish standards (Donnelly, 2004; Lokan, Greenwood & Cresswell, 2001; McGaw, 2008).
Within this context of comparing Australian and Finnish student performance, one might question what it is that differs between the Australian and Finnish student bodies beyond mere average performance levels. Much has been written about Finnish education policy, school systems, teacher education and classroom practices; however, speculation arises over whether there are deeper issues that underpin the Finnish success that have not yet been thoroughly explored. It is pertinent to question whether or not Australian and Finnish students approach education with similar or different dispositions towards learning processes. Perhaps Finnish students approach learning and education differently to Australian students. Perhaps, their performance is explained by more positive dispositions. These questions led to the conceptualisation of the research question that formed the basis of this study, articulated here.

Are there differences between Australian and Finnish school students’ dispositions towards learning, and if so, are there links between differences in dispositions and known differences in performance?

This introductory chapter outlines the rationale and subsequent direction of this research project. Firstly, the contextual background of the current education climate is considered, and then within that context the research problem is thoroughly discussed, the research question framed and the theoretical contention stated. Additionally, the aims of research are articulated and the significance of this particular project is explained. The chapter concludes by briefly outlining the direction taken by successive chapters in this thesis to answer the research question.
1.2 Context of research

It would seem that the measurement of academic performance has become increasingly paramount in education circles as this era of information highways and globalisation has brought about an international quest for talent (Ball, 2008; Bernstein, 2001; OECD, 2007). Ball (2008) believed these academic talent quests to be reflective of global shifts to knowledge economies where progress advances from the ideas of innovative and creative individuals. Accordingly, commentators have identified education as taking a leading role in sustaining and developing economies (Ball, 2008; Bernstein, 2001, Samoff, 1999; Yeatman, 1993). Bernstein (2001) argued that individuals as consumers, entrepreneurs, investors and innovators in the education market are becoming ever more ‘pedagogised’ as time and space are overtaken with learning opportunities. Moreover, Bagnall (2007) believed social spaces to be shrinking, or at least becoming increasingly shared as globalisation ever more impacts systems of operation. One such operating system is education, though it is far from an isolated entity as it is inseparable from other monetary and political systems. Education system requirements are high, to say the least, as there is an ever-sharpening focus on all aspects of schooling. Results, outcomes, high performance, quality, choice and equity are all expectations in the current education contexts, which are driven by market forces. Ball (2008) described education as subordinate to economic systems, increasingly susceptible to profit and vital to knowledge-based, high-skills economies. He described knowledge economies as reassertions of the competition or managerial state.

Sahlberg (2007) explained that Finland itself has used education for economic and social development in recent times by successfully transitioning from an agrarian/industrial-
based society in the 1950s to the knowledge economy and welfare democracy it is today. Samoff’s work (1999) argued that societies have histories of borrowing and conquest and proposed that in the realm of education this may be evident in educational achievement being associated with elite status and power. Further, Samoff (1999) likened education to investment and production, and in less developed countries, to a delivery system for outside aid.

With reference to Australian society, Yeatman (1993) also discussed this change from a welfare state to a competition state by describing a recent transition within the public sector from delivering public values to resource management. Kelly (2009) also commented about a similar shift in education from intrinsic values to extrinsic concerns in a discussion about the competitive nature of schooling and the subsequent increase of ‘league tables’. Ball (2008) flagged such shifts as the end of locally administered national systems and suggested that these shifts reflect a desire for policy reform and intolerance toward present policy and practice. Furthermore, Ball believed that policy condensates like Australia’s “The Clever Country” were indicative of the collapse of social and educational policies of the past into economic and industrial policies of the present.

Bonner and Caro (2007) lamented this industrialisation of education in Australia and the associated paradigm shifts in values. They were of the persuasion that Australian education had become a vehicle for individual positional advantage rather than existing for the common good of the nation. Although Donnelly (2004) assumed a more conservative stance, he too gave a scathing report of educational practice and policy in Australia, describing it as dumbed-down, politically correct and under-performing. Donnelly strongly
urged Australians to look abroad to learn from best practice to address the system crisis. In this competition climate it is not surprising then that Australian educators look to the Finnish model for answers and researchers delve into the realm of comparative education.

Arnove (1999) explained that comparative education has experienced quite a metamorphosis since the times of the pioneering work of Arc-Antoine Jullien and Cesar August Basset in the early nineteenth century. As a field of study it has moved from researching macro- and micro-trends and forces in education, to presently being more concerned with the dynamics between international trends and local responses. Accordingly, international organisations, including the World Bank, United Nations arms (UNESCO, UNDP, UNICEF) and the OECD, have increasingly taken the lead in the field of comparative education, particularly in the context of performance measurement (Arnove, 1999; Ball, 2008; OECD, 2001). Ball (2008) believed such organisations to be responsible for this international fixation with performance measurement, describing the OECD’s PISA as a leader in this comparative environment.

Duly considering this wider context, an international comparative study was conducted by this project to explore whether there is something to learn from the Finnish example. From the outset it is acknowledged that although Australian educators would do well to learn from the Finnish scholastic success, Finland is culturally and historically unique and therefore all lessons must be taken in the context of pragmatic application to Australian settings. Nevertheless, the question remains whether cross-cultural examination can afford insights into reasons behind the differences between Australian and Finnish students.
1.3 The research problem

Apart from the immediately apparent differences of climate and landscape, Finland and Australia share numerous commonalities. Both are developed countries with democratic systems of governance; both have successful welfare and economic systems; both are what might be termed ‘industrialised’ civilisations. Therefore, the differences between the academic results of Australian and Finnish students are intriguing. The OECD administers PISA every three years to assess the academic performances of students at the end of their compulsory schooling who are approximately 15 years old, and it is in these studies that Finnish students have come to the fore. Although the academic performance of Australian students ranked well above the OECD averages, Finnish students performed considerably higher than all other countries in the three studies conducted thus far (OECD, 2001, 2004, 2007). Moreover, the Finnish performance scores improved in all areas of assessment over the three consecutive PISA data collection periods whereas Australian scores experienced some decline (McGaw, 2008). These movements are illustrated in Figures 1.1-1.5.
Table 1.1.

Australian students’ rankings in reading compared to other leading countries

<table>
<thead>
<tr>
<th>PISA 2000</th>
<th>PISA 2003</th>
<th>PISA 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahead of Australia</td>
<td>Finland</td>
<td>Finland</td>
</tr>
<tr>
<td></td>
<td>Finland</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Korea</td>
<td></td>
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<tr>
<td>Same as Australia</td>
<td>Korea</td>
<td></td>
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<tr>
<td></td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New Zealand</td>
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<tr>
<td></td>
<td>Hong Kong</td>
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<tr>
<td>Behind Australia</td>
<td>Hong Kong</td>
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(McGaw, 2008, p. 4).

Table 1.1 shows that in all PISA studies Australian students are amongst the highest-ranking in the world in reading performance, but Finnish students consistently outperform them. Furthermore, in the most recent PISA study in 2006 Australian students were surpassed by four other countries that had previously had similar rankings in 2000 and 2003.
This apparent decline in performance in Australia is concerning. Figure 1.1 below graphs this decline and the performance of other comparable countries.

**Figure 1.1. OECD trends in reading performance**

![Graph showing OECD trends in reading performance](image)

( McGaw, 2008, p. 5).

As can be seen in Figure 1.1, the reading performance of Finnish students has remained consistently high over the PISA data collection periods, whereas the reading performance of Australian students has declined. This is not a phenomenon specific to reading literacy, as Figure 1.3 shows that the performance of Australian students in mathematics has suffered also.

Performance in mathematics is quite different between Australia and Finland. Since 2003, the year that mathematics was the prime focus of the PISA studies, the mathematical performance of Finnish students has improved, whereas the performance of Australian
students has declined. Table 1.2 shows the increase in the number of countries surpassing Australia over the data collection periods.

Table 1.2.

*The ranking of Australian students in mathematics compared to other leading countries*

<table>
<thead>
<tr>
<th></th>
<th>PISA 2000</th>
<th>PISA 2003</th>
<th>PISA 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahead of Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hong Kong</td>
<td>Taiwan</td>
<td>Finland</td>
<td>Korea</td>
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<tr>
<td>Finland</td>
<td>Hong Kong</td>
<td>Korea</td>
<td>Netherlands</td>
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<tr>
<td>Korea</td>
<td>Switzerland</td>
<td>Canada</td>
<td>Macao</td>
</tr>
<tr>
<td>Same as Australia</td>
<td>Finland</td>
<td>Switzerland</td>
<td>Japan</td>
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<tr>
<td>Korea</td>
<td>Canada</td>
<td>Japan</td>
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<tr>
<td>Switzerland</td>
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<tr>
<td>Canada</td>
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(McGaw, 2008, p. 9.)
Figure 1.2 also shows the differences between the average mathematical performances amongst Australian and Finnish students. Not only have the performance of Australian students declined and the Finnish performance improved, but also the increased difference between the two groups’ averages is quite substantial.

*Figure 1.2. OECD trends in mathematical performance*

(McGaw, 2008, p. 10).

Similar graphed results are not available in the area of scientific literacy as 2006 was the first year it took prime focus in the PISA programme and science was assessed meticulously. Nevertheless, Table 1.3 below shows that the performance of Australian students in science has been strong over the data collection periods.
Table 1.3.

*The ranking of Australian students in science compared to other leading countries*

<table>
<thead>
<tr>
<th></th>
<th>PISA 2000</th>
<th>PISA 2003</th>
<th>PISA 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahead of Australia</td>
<td>Japan</td>
<td>Finland</td>
<td>Finland</td>
</tr>
<tr>
<td></td>
<td>Korea</td>
<td>Japan</td>
<td>Hong Kong</td>
</tr>
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<td>Same as Australia</td>
<td>Hong Kong</td>
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<tr>
<td></td>
<td>Canada</td>
<td></td>
<td>Korea</td>
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</table>


Although the performance of Australian students in scientific literacy has been strong, Finnish students have streaked ahead in the last two assessment periods. Overall, Finnish students significantly outperformed other countries in most areas of the OECD’s PISA study (OECD, 2001, 2004, 2007). Figures 1.1-1.5 are useful for comparing Australian and Finnish performance; however, they do not explain the reasons behind these performance differences. In the context of this study, specifically whether there are differences in student dispositions. This particular research project moved beyond simple comparisons of performance to dig deeper to discover the gaps in knowledge about the differences between Australian and Finnish students. It investigated the PISA data to new
depths in an effort to uncover and analyse new information that had the potential to shed
light upon the differences in dispositions between Australian and Finnish students.

1.4 The research question

Careful consideration of the research problem and an interest in whether or not
differences exist between the two countries at a deeper level, particularly student
dispositions, has led to the following research question:

| Are there differences between Australian and Finnish school students’ dispositions towards learning, and if so, are there links between differences in dispositions and known differences in performance? |

By way of explanation, this research question evolved from an original quest to
better understand the known differences in performance between Australian and Finnish
students by seeking to unearth potential differences in the values that they placed upon
education. However, the term ‘values’ was problematic as it is very broad and surrounded
by many possible discourses. Therefore, in an attempt to refine the research question, the
term ‘student dispositions’ was adopted as a subset of greater values. The term ‘student
dispositions’ is defined in Chapter 2.
1.5 Theoretical contention

Acknowledging the known differences in performance between the two countries, and deliberating whether or not there are differences in student dispositions between the two countries, it is the theoretical contention of this project that Finnish students have more positive dispositions towards learning than Australian students, all other things being equal. In order to answer the research question and test the theoretical contention, this study has specified the aims below.

1.6 Aims of the study

A thorough study of available literature revealed that there is a limited amount of knowledge about specific differences between Australian and Finnish students, particularly with regard to their dispositions towards learning and whether these are linked to academic performance. Therefore, the aims of this project were as follows: (a) in a comparative study, to uncover the dispositions towards learning between Australian and Finnish students and report any differences; (b) to assess the links between student dispositions towards learning and student performance; and (c) to add to current knowledge by positing information that has the potential to assist students to achieve best results in education, making recommendations for further research and suggestions for improving education in Australia.
1.7 Significance and innovation of the research

Although much research exists about the PISA outcomes, specific comparisons of differences between Australian and Finnish students are scarce. Moreover, it was found that much of the literature pertaining to the PISA studies was primarily concerned with student results rather than deeper issues like students’ dispositions towards learning. This study is innovative in that it is concerned with investigating the personal perceptions and attitudes of the students themselves as they have appeared in the quantitative data, and comparing these with their academic results. This is a unique approach as most other literature about PISA encapsulates student results within the opinions and perceptions of education professionals. Once differences between the dispositions of students in Finland and Australia are known conclusions are drawn about the influences of dispositions towards learning upon academic performances. Furthermore, with the greater knowledge of the reasons behind the Finnish success, suggestions for the improvement student performance in Australia become possible.

1.8 Structure of the thesis

This chapter has framed the research question within the context of the wider research problem and the overarching context of the present educational climate. It has made clear the aims of this project and its significant contribution to knowledge. Chapter 2 presents a thorough review of literature regarding student dispositions and associated indicators to clarify what is and what is not known about the research problem and associated question. Following this critical review of literature, an examination of the nature of the OECD’s PISA is presented in Chapter 3. As such, Chapter 3 is a little unconventional
for an academic thesis. Nevertheless it was necessary to thoroughly investigate what is known about Australian and Finnish students within the PISA context as Chapter 4 specifies that the existing PISA datasets be used to investigate student dispositions. Quantitative methods were employed for this purpose and Chapter 4 expounds the underpinning methodology and theoretical perspective for these methods. Much care has been taken in the selection process of PISA data so that findings are valid to solve the research problem. The results of quantitative analysis of the data are presented in Chapters 5 and 6. This chapter highlights positive and negative student dispositions in both countries and their links to performance, and areas of student dispositions in need of attention in Australia. Chapter 7 presents a closing discussion and Chapter 8 draws conclusions about student dispositions and makes recommendations for learning practices and further research.
2.0 LITERATURE REVIEW

2.1 Introduction

Chapter 1 framed the research problem within current education contexts. By doing so it illuminated the need for deeper research about student dispositions towards learning and the links they may have to performance, especially amongst Australian and Finnish students. From that basis, this chapter explores available literature to examine the relationships between student dispositions towards learning and performance. As articulated in the research question the particular focus of this project was the differences between Australian and Finnish student dispositions. The question posed by the problem as stated in the introduction reads: *Are there differences between Australian and Finnish school students’ dispositions towards learning, and if so, are there links between differences in dispositions and known differences in performance?* Before opening a comparative discussion about Australian and Finnish students it is appropriate to critique current research about student dispositions in relation to performance. This will be conducted under the following main headings: the effects of students’ dispositions upon learning; the influences of broader socio-cultural contexts upon dispositions towards learning, specifically home and school; and indicators that have been used for measuring students’ dispositions.
2.2 Framework for literary review

Firstly, the focus of this section will be on the consideration of current research about student dispositions. For the purpose of this review, the model put forward by Brickman and Miller (2001), as seen in Figure 2.1, will be used as a framework for discussing these concepts. Central to their thesis about the impact of socio-cultural contexts on future goals and self-regulation, this model illustrates that certain factors have interrelated effects upon a student’s perceptions, behaviours and performance. Although this model is not restricted to school students, Brickman and Miller (2001) described education as a future goal as individuals have the capacity to determine its role in their future plans. Furthermore, the model illustrates interrelated factors that influence task engagement and performance. Therefore, it presents as a suitable model for use in this project. As Brickman and Miller explained, some of the factors in their model are more immediate in nature, like perceptions, and other factors are influenced by the past. The model’s factors include: values; knowledge of possibilities; personally valued future goals; proximal goals; self-concept; problem solving and learning strategies; and perceptions of obstacles, ability, task value and instrumentality. This project collectively refers to these factors as student dispositions and is concerned with their ultimate affects upon performance. This review evaluated the relationships between these factors and performance and, in light of other literature, determined the adequacy of the Brickman and Miller model as a framework for researching student dispositions by further investigating whether or not other important factors also exist that comprise dispositions and affect performance.
**Figure 2.1** Brickman and Miller’s model for the impact of socio-cultural context on future goals and self-regulation

(Brickman & Miller, 2001, p.121).

In their diagram (Figure 2.1) Brickman and Miller (2001) separated a person’s immediate socio-cultural context, including various perceptions, from more longstanding factors like values and knowledge to illustrate impacts of socio-cultural contexts upon self-regulation and future goals. At the top of the Brickman and Miller model is an overarching bubble called “past experiences in socio-cultural context” which includes home and school contexts. The diagram shows how past experiences in these contexts influence factors that make up student dispositions and in due course affect performance. The value of this model is the depicted interrelated relationships between all these factors and accordingly this review uses these factors to scrutinize the effects of dispositions upon performance.
However, as it was designed to illustrate the impacts of socio-cultural contexts upon future goals, rather than the specific effects of dispositions upon performance, it was subjected to critique and further empirical elaborations. This project was more concerned with the effects of these collective behaviours and perceptions upon performance, so to this end these interrelated factors that ultimately affect performance were grouped together as **student dispositions**. Nevertheless, it was useful as a beginning framework for this review.

For the purpose of this project the term **student disposition** is used to describe the collective factors of Brickman and Miller’s 2001 model of socio-cultural impact upon future goals. In summary, these include: personal values and perceived task value and importance; knowledge of possibilities and perception of obstacles; learning strategies (with a particular focus upon reading); self-concept; self-efficacy; and motivation and movement towards personal future goals.

The Australian Government (2008) has also recently given weight to student dispositions, describing them as enduring habits of mind that are developed early in life and fostered through open-ended resources, ample time, and positive relationships and sustained conversation with educators.
2.3 The effects of student dispositions upon learning

Following the definition of student dispositions and the themes of the Brickman and Miller (2001) model, this section highlights the relationships between student dispositions toward learning and performance in the following areas: personal values and perceived task value and importance; knowledge of possibilities and perception of obstacles; reading as a learning strategy; self-concept; self-efficacy; and motivation and movement towards personal future goals. Firstly however, a foundational discussion about student dispositions in the context of lifelong learning reinforces the model of Brickman and Miller (2001) adopted by this project.

2.3.1 Dispositions as a part of lifelong learning

The term ‘lifelong learning’ is as familiar as the words ‘school’ or ‘teacher’ within the education profession. Historically, use within literature can be traced back to the 1800s, confirming its longevity as a prominent educational idea. When discussing lifelong learning Leonard (1970) referred to the chain of learning, explaining that species-long learning is accumulated knowledge passed down and built upon from previous generations and that lifelong learning occurs at an individual level.

Dave, the Director of the UNESCO Institute for Education, described lifelong education as;

… a very comprehensive idea which includes formal as well as non-formal learning extended throughout the lifespan of an individual to attain the fullest possible development in personal, social and professional life. It includes all desired learning
that occurs in a planned or incidental way in the home, educational institutions, community and place of work. Lifelong education encompasses all stages and aspects of education in an integrated and articulated manner. (1973, p. 30).

Broadly speaking, lifelong learning refers to the development of a personal skill-set that includes the likes of the ability to identify learning goals, autonomous learning (autodidaxy), self-management and direction of learning, positive dispositions towards learning, appropriate selection of learning strategies, interpretation skills, literacy and multi-literacy, technology skills, evaluation skills, and adaptability to and implementation of change (Leonard, 1970; OECD, 2001, 2004, 2007). This list of attributes is not unlike the factors contained in the Brickman and Miller model (2001) adopted by this project.

2.3.1.1 Lifelong learning and PISA

One of the assumptions of PISA is that children first come to school with a predisposition to learn (OECD, 2004). The Australian Government (2008) also proposed that the process of schooling influences student attitudes toward learning and achievements. The OECD (2001, 2004) believed that the role of teachers in learning management is indisputable; however, they also believed that the learning process is much more positive if students themselves also managed their own learning. It would be expected that students would take on more of their learning management as they mature with age and educational grade. Therefore, underpinning the PISA programme is the OECD’s belief that a comprehensive assessment of learning not only includes academic results, but also cognitive, affective and attitudinal influences (OECD, 2004). Consequently, student questionnaires that accompanied the PISA scholastic tests gathered data about students’ home backgrounds, and
individual perceptions and beliefs about education. For example, most recently the Student Questionnaire for PISA 2006 collected data pertaining to the following broad areas: family background, views on various issues related to science, views on the environment, careers and science questions, learning time questions, teaching and learning science questions (OECD, 2006). These methods are supported by Rutter (1983), who explained that students’ self-reports are preferable over teacher reports as they have been found to be more valid for cross-school comparison. Further, Schneider (1996) argued that evidence from selected countries has shown that 15-year-old students possess sufficient knowledge about their own learning to offer justifiable answers (as cited in OECD, 2004).

As mentioned above, Chapter 3 will look closely at PISA literature to establish the already known landscape of students’ dispositions towards learning and their impacts upon student performance. Original data analysis that uncovers specific differences between Australian and Finnish students is later reported in Chapters 5 and 6. Presently, with the relationship between lifelong learning and student dispositions established, attributes of student dispositions are explored below.

2.3.2 The effect of personal values and perceived task value and importance

The first facet of student dispositions reviewed here is the notion of values, both personal values and the perceived value of a task. As discussed later in Section 2.4.1 on the influence of the home, McInerney and McInerney (2006) argued that parents have the most influential role in forming students’ personal values. Their and other research showed that the internalisation of parents’ values about effort and education, or even the sense of value that students perceive their parents have about them and their schooling, is linked to
improved attitudes to school and better academic outcomes (Gonzalez-DeHass, Willems & Holbein, 2005; Marchant, Paulson & Rothlisberg, 2001). Moreover, Brickman and Miller (2001) explained that past experiences also influence a person’s values and consequently influence the development of future goals and their sub-goals.

Porter (2007) argued that people define the value of a task by their belief in whether or not it will help them achieve their goals. This argument stresses the connections between task value and motivation to achieve goals and performance. These connections are also illustrated in the Brickman and Miller (2001) model. In terms of valuing a learning activity, Porter (2007) reported that students must value learning behaviours and their associated constraints and disciplines if they are to engage in a learning activity in a pro-social fashion. Brickman and Miller (2001) also explained that students are more likely to place value upon an immediate task if they can see its instrumentality in reaching their goals. Therefore, knowledge becomes more valuable when it is perceived to be useful for performance if performance increases the chances of attaining future goals.

In terms of future goals, Teese and Polesel (2003) argued that the effects of education upon the workforce in turn have a domino effect upon a country’s economy and society. This highlights the need for societies valuing education and successful foundational schooling in order to ensure an educated workforce and life-long learning in the future. The OECD’s 2004 report on PISA 2003 found that on average across all OECD countries those with less formal education receive less ongoing training in the adult workforce. This report gave rise to the issue of post compulsory education (in the form of professional development or on-the-job training) being likely to occur about three times more amongst the tertiary qualified than amongst those with less than upper secondary education.
2.3.3 The effect of knowledge of possibilities and perception of obstacles

The next facet of student dispositions critiqued here is a student’s available knowledge of options and possibilities and how they perceive and respond to obstacles that may arise during their journey of education. When referring to their model of socio-cultural impacts on future goals and performance, Brickman and Miller (2001) explained that people differ in their perceptions and knowledge of the necessary steps and sequence to advance towards future goals. Such knowledge is acquired through wider socio-cultural experiences, usually transmitted through parents or other community members. This explanation confirms the link between the wider socio-cultural influence of the home (as discussed in Section 2.4.1) and the operational knowledge that students bring to a task. Brickman and Miller (2001) argued that people’s knowledge can differ in terms of the types and extent of experiences they have had, exposure to role models, and support to set and pursue future goals.

Based on their knowledge and self-efficacy, people also differ in their approaches to obstacles that may arise. Brickman and Miller (2001) proposed that the identification of obstacles to learning may either result in the development of strategies to overcome and achieve future goals or in the abandonment of goals that require learning. They believed that once an obstacle is removed or overcome students generally report more positive perceptions of their own ability. In a discussion about initiative and self-starting behaviour Ponton and Carr (2000) linked self-related beliefs to persistence in overcoming obstacles. They believed initiative to be influenced by perception of obstacles, similar to the relationship shown in Brickman and Miller’s model (2001). This shows the connectedness between knowledge,
perceptions and self-concept, which in part comprise a student’s disposition towards learning and are linked to the achievement of future goals and performance.

2.3.4 The effect of learning strategies, and the importance of reading

Another facet of student dispositions reviewed here is the strategies that students possess to help them learn and pursue their goals. The OECD’s first PISA report (Artelt, Baumert, Julius-McElvany & Peschar, 2003) showed that students were more likely to invest in effective learning strategies if they had positive attitudes towards learning. The PISA researchers gave significant attention to student approaches to learning and concluded that positive attitudes, motivation and strong-self related beliefs were central to developing self-managed learning techniques, which are prerequisites for life long learning. Therefore, in order to foster life-long learning characteristics, positive dispositions (wanting to learn) and cognitive tools and learning strategies (knowing how to learn) go hand in hand (Artelt et.al, 2003).

In terms of specific learning strategies, this project takes a particular interest in reading, as it is a cross-curricular skill and shown to be linked to self-concept, realising personal goals, motivation, confidence and other learning strategies and behaviours (Artelt et.al, 2003). Moreover, Artelt et al. (2003) proposed that weak readers encountered significant problems with developing these learning dispositions. In his research, Paulo (1983) also suggested that whether or not a student likes to read may influence his or her performance. Furthermore, Kelly (2009) articulated the need to preserve the love of reading, warning that schools are at risk of quenching appreciation for the written word in an effort to improve reading performance.
At a scholarly level, factors that facilitate the process of reading comprehension include prior knowledge, capacity of the working memory and reasoning ability. Artelt et al. (2003) were of the opinion that these factors free cognitive resources for deeper-level thinking and the processing of new information into pre-existing frameworks of understanding. Therefore, exposure to a wide variety of resources is advantageous, but likely determined by socio-economic factors as discussed in Section 2.4.

2.3.5 The effect of self-concept

Another facet of a student’s disposition towards learning is their concept of themselves as a learner (Brickman & Miller, 2001). Zimmerman (1999) argued that high performance is a product of students’ beliefs in their own abilities and is demonstrated by whether or not they instigate investments into their own learning. Moreover, it would appear that self-concept is contextual. That is, amongst any given group, the higher achievers of the cohort are likely to have more positive self-concepts than the lower achievers, even if they are not high achievers on an overall scale. It appears that students use relative subjective standards on which to base their self-judgments (OECD, 2001, 2004, 2007). If students reach the age of 15 with low self-confidence, they are less likely to make an effort to position themselves for learning in adulthood. PISA results (OECD, 2001, 2004, 2007) reflected this causal relationship, showing that students’ self-related beliefs propel learning success, rather than merely reflecting it. It appears to be a cyclic relationship of self-concept feeding achievement which then feeds self-concept and so on. As Porter (2007) explained, not only does self-concept feed achievement, it also feeds effort, and so we see reciprocal relationships between self-concept and effort, student dispositions and achievement.
Although not included in the Brickman and Miller model, effort was used as an indicator of student dispositions in this project and its links with self-concept and motivation are discussed further in Section 2.5.5.

### 2.3.6 The effect of self-efficacy

Similar to but not the same as self-concept is academic self-efficacy, the belief in one’s own ability to overcome difficulty. Porter (2007) described efficacy as our sense of personal potency and the ability to influence occurrences about and within us. Confidence in personal ability is only part of the self-efficacy equation. The OECD (2004, 2007) believed that confidence to master task-specific skills, in order to make investments into learning makes up the balance of confidence in a successful learner. Self-efficacy is a set of personal beliefs that can be carried into many subject areas, differing from academic self-concept, which can be subject-specific. Moreover, research has shown that a lack of self-efficacy is often carried into adult life and the relationship between self-efficacy and performance is reciprocal (Stajkovic & Luthans, 1998; OECD, 2007). Those who believe they have the ability to overcome are more likely to achieve higher results; and those who achieve highly, in turn believe in their own abilities. Furthermore, those who achieve are believers in the merits of learning. Bandura (1994) believed that the degree of a student’s self-efficacy determined the amount of effort invested into a task. The OECD (2007) used scales of effort to measure efficacy, demonstrating the inter-related nature of self-efficacy and effort in student dispositions. Therefore, this project will use effort as an indicator to measure efficacy (discussed further in Section 2.5.5).
2.3.7 The effect of motivation and movement towards personal future goals

The last facet of student dispositions to be reviewed is inherently linked to all the other facets—motivation and movement towards personal future goals. The Brickman and Miller model (2001) used the term “personally valued future goals” (p. 121). For the purpose of this project motivation will be coupled with the notion of movement towards such goals. Motivation is a person’s internal instigation and direction that informs their behaviour. McInerney and McInerney (2006) explained that it is influenced by family, culture, health, and prior physical, social, emotional and environmental learning experiences. Furthermore, MacCallum (2001) reported that educational motivation is influenced by peers, teachers, parents, subjects and schools and is also informed by ethnic and cultural backgrounds. Brickman and Miller (2001) considered the pursuit of an education as a personally valued future goal.

Porter (2007) discussed student motivation in two categories, mastery-oriented and performance-oriented motivation. Mastery-oriented students are more concerned with the acquisition of knowledge and skills and performance-oriented students are more focused on attaining a grade or achievement and are usually more competitive in nature. Furthermore, McInerney and McInerney (2006) referred to work avoidance and morality-based goals in the education context. Work avoidance is concerned with the types of strategies that students use to avoid or minimise engagement in academic tasks, reflecting poorer dispositions towards education. Meece and Miller’s work (1996) suggested that there is a relationship between decline in intrinsic motivation and increase in work-avoidance motivation. The McInerney and McInerney model (2006) as outlined in Figure 2.2 illustrated task approach and task avoidance, comparing the relationships between desire for success and fear of
failure. A greater desire for success is more likely to result in approaching a task whereas a greater fear of failure is more likely to result in task avoidance. Notwithstanding this, McInerney and McInerney (2006) explained that in some instances morality-based goals supercede work avoidance when students are more concerned with making satisfactory contributions to co-operative learning situations than their actual ability. Students with morality-based goals or motivation demonstrate positive dispositions towards learning for the sake of other team members.

*Figure 2.2. McInerney and McInerney’s approach and avoidance effects*  

(McInerney & McInerney, 2006, p. 216).

Martin (2003) proposed that motivation and engagement are highly dependent upon each other and together underpin performance. In order to explain this relationship, Martin developed a student motivation engagement wheel shown in Figure 2.3. At the top of Martin’s wheel are positive student dispositions that he referred to as ‘booster’ thoughts and
behaviours that are associated with higher levels of motivation and engagement. At the bottom of Martin’s wheel are negative dispositions that he referred to as guzzlers and mufflers, which result in declines of motivation and engagement. Martin’s diagram complements the Brickman and Miller (2001) model adopted by this study by showing the effects of facets of student dispositions upon motivation to move towards future goals.

Figure 2.3. Martin’s student motivation and engagement wheel

(McInerney & McInerney, 2006, p. 249).

Following the Brickman and Miller (2001) model that has been adopted by this project, the attainment of future goals occurs in practice by developing systems of self-regulation to realise a sequence of sub-goals. When sub-goals are considered to have an instrumental relationship with the achievement of future goals, their attainment affects a
person’s perception of accomplishment and helps them set the pace for engagement, persistence and effort (Brickman & Miller, 2001). In practice effort is a key indicator of motivation. The subject of motivation with reference to the amount of effort invested into learning is discussed in more detail in Section 2.5.5. However, before looking at the indicators of student dispositions, it is prudent to consider the wider influences of socio-cultural contexts in Section 2.4 below.

2.4 The influences of broader socio-cultural contexts upon dispositions towards learning

So far this chapter has outlined literature that supports the illustrated interconnected relationships between student dispositions and performance in the Brickman and Miller model (2001). Therefore, it is timely to also look at the influences of socio-cultural contexts upon student dispositions, with particular focus upon home and school environments. Christenson (2004) stressed the importance of the relationship between the wider socio-cultural contexts of home and school, particularly the inter-dependence between parents and teachers for the sake of the students.

2.4.1 The influence of the home

In terms of students’ dispositions towards school, McInerney and McInerney (2006) reported that the family held the most influence followed by teachers and peers. Peers took a more influential role in terms of fashion and appearance; but students were more allegiant to parents’ values when it came to fundamental life matters. In addition to values, students bring something with them from home that Fay (2001) termed ‘educational capital’—inbuilt
knowledge, skills and behaviours that are either more or less compatible with the school environment. Fay (2001) believed that educational capital determined a student’s orientation towards learning. In this section on the influence of the home, two main areas have been critiqued: language use in the home and parents’ education and employment.

2.4.1.1 Language use in the home: a discussion of cultural capital

It seems nearly impossible to separate a child’s academic success from the influence of his or her parents, thus a love of learning is difficult to promote in school environments without the support of the home (Artelt et al., 2003). Ho and Willms (1996) suggested that one of the most enduring findings in the study of educational sociology is that schooling outcomes are related to the socio-economic status (SES) of a child’s parents. When taking a closer look at the influence of SES upon student dispositions, a discussion about cultural capital (Bourdieu 1977) is useful for establishing a literary background. In short, Lie et al. (2003) described cultural capital as including “parental education, highest family socio-economic index, home cultural competence, student’s cultural activity, home cultural possessions, home educational resources and books at home” (p. 89). According to Bourdieu’s (1977, 1984) cultural reproduction theory, language is a key aspect of cultural capital. He distinguished the use of language in the home as more than just a method of communication, in as much as it acts as a means for establishing systems of categorisation. Heath (1983) found that social class has significant influence upon perception, linguistic codes and the transmission of knowledge. Previous to Heath’s research, Bourdieu, Passeron and Nice (1977) differentiated between common or working-class language and bourgeois language, which is regarded as formal, intellectual, and euphemistic. Bourgeois language practices are associated with knowledge of respected cultural systems, for example music
and classical literature. Therefore, language as a key aspect of cultural capital is related to values, preferences and dispositions. According to Bourdieu and Nice (1984) a lack of cultural capital, as evidenced by language use, potentially distances students from academic cultures, which consequently affects performance, career choices and success within education systems: for example, Hart and Risely (1995) reported that longitudinal research has shown that growth trajectories for vocabulary development in children begin to differ according to SES background in the early years, so by the time children enter compulsory schooling the impact of socio-economic background upon cognition and behaviour is already well established. It is also important to note that reading has been shown to be of crucial importance in overcoming social disadvantage (OECD, 2002b; Guthrie & Wigfield, 2003) and as such it is possible to overcome SES disadvantage, as approaches to learning affect performance over and above family background (Artelt et.al, 2003).

2.4.1.2 The impact of parents’ education and employment

Research shows that the children of low-income and low-educated parents, or those with parents who are unemployed or working in low-prestige occupations, are less likely than their peers with higher SES parents to succeed in academic endeavours or be engaged in extra-curricular activities (Datcher, 1982; Finn & Rock, 1997; Johnson, Crosnoe & Elder, 2001; Voelkl, 1995). By contrast, the OECD’s research (2004) showed that socio-economic background does not automatically determine performance: for example, poor performance is not a direct reflection of a poor family. Nevertheless, home background does remain as one of the most powerful influencing factors over performance. Artelt et al. (2003) made some principal observations about home backgrounds and learning from the first PISA study in 2000. In summary they are as follows. Firstly, positive self-related beliefs seemed to be
consistently higher amongst students whose parents have higher-status jobs. Secondly, students from less advantaged backgrounds were more cautious about career and higher education choices than more advantaged students with the same level of performance. Thirdly, students from more advantaged socio-economic backgrounds made more use of learning control and elaboration strategies. And lastly, students from higher socio-economic backgrounds were more likely to show enthusiasm for competitive learning in about half the countries. Disadvantaged students seemed to put in just as much effort as their advantaged peers, but their motivation fell short in intrinsic interest in reading. This may be attributed to less stimulating home environments.

Research has also found a direct relationship between the education of the mother and student performance (OECD, 2004). Significant differences exist between children whose mothers have completed upper secondary education and those whose have not. A further difference was noted again amongst children whose mothers have completed tertiary education.

Teese and Polesel (2003) shared a negative view of Australian schooling in its current structure and argued that it contributes to economic marginalisation, which is particularly felt amongst the children of manual workers or the unemployed. Similarly, the Parliamentary Library (Australia) (2004) research findings from other OECD studies showed the ‘investment in knowledge’ in Australia to be below the OECD average. Teese and Polesel’s (2003) research showed the links between family backgrounds and success in schooling. They argued that schools should take responsibility for re-creating poverty, claiming that academic achievement in secondary schooling is linked with SES, resulting in
the children of low skilled parents paying the economic penalty of low achievement. In this light, it is timely to consider the influence of schooling, discussed in the following section.

2.4.2 The influence of schooling

As illustrated by the Brickman and Miller model (2001), another wider socio-cultural context that influences student dispositions is experiences at school. School has long been attributed with affecting students’ development, behaviour, motivation, and learning progress (Blumenfeld, 1992; Porter, 2007; Rutter, 1983; Sylva, 1994). Therefore, this section of the literature review critiques the socio-cultural contexts of the Australian and Finnish schooling systems in the light of later comparison of its influences upon student dispositions between the two countries. An exploration of the two different schooling systems takes place under the following headings: (a) foundational and constitutional differences; (b) private vs. public schooling; (c) autonomy versus centralisation; (d) typical school day; and (e) teacher status in society. These headings explore societal paradigms and their impacts upon schooling. As Donnelly (2004) debated, if student dispositions are affected by schooling and schooling is affected by its society, then ultimately student dispositions are influenced by society as a whole.

2.4.2.1 Foundational and constitutional differences between the education systems of Australia and Finland

It would seem that Finnish education, culture and democracy meld together. Whereas, education in Australia is not so fundamentally linked to culture or a democratic way of life. To explain these differences, this section explores the historical contexts of education in
Linnakylä (2007) explained that the roots of the Finnish education system were founded in the teaching of reading. Before any formalised schooling began, the church took up the responsibility to ensure that the population was literate, as this was considered vital for enlightenment. The University of Helsinki website explains that as early as the 1620s, reading was pronounced a necessary pre-requisite before confirmation and marriage (http://www.pisa2006.helsinki.fi/finnish_school/timeline/timeline.htm). Linnakylä (2007) reported that the home and church model was largely successful in raising a literate population, and placed a special focus upon the literacy of women. Interestingly, the female population in Finland today has the highest reading literacy average in the world (OECD, 2001, 2004, 2007). To propagate Christian doctrine the 1686 Church Law required every young person to learn to read, so by the time an established school system emerged in the 1860s one of the prerequisites for admission was the ability to read. As time passed education became the responsibility of the state and in the 1970s Finland introduced a nationwide comprehensive schooling system, which can be found on the Finnish Ministry of Education website (http://www.minedu.fi/OPM/Koulutus/kouluutuspolitiikka/?lang=en.). The focus of this movement was to ensure equity and quality for every child, regardless of geographical residence or socio-economic status. All education from pre-school to post graduate is publicly funded and it is considered a basic right, rather than a privilege. Today, however, despite its foundation in religious institutions, Finnish education is largely secular.
The Finnish Ministry of Education website explains that Finnish society highly values education and deems it to be a cornerstone for societal welfare, believing that education is irrevocably linked to democracy (http://www.minedu.fi/OPM/Linjaukset_ja_rahitoitusa RIGHTSlang=en). Rinne, Kivirauma, Aro and Simola (2000) described Nordic education systems to be aspiring for social justice through education (as cited in Lie et al., 2003). Simola (2005) and Sahlberg (2007) both argued in their respective research that the Finnish approach to education is the result of a consensus-based collectivist society. Sahlberg (2007) explained that since the 1950s Finnish society has undergone significant economic change, moving from an agrarian based society to the knowledge based society that it is today. Notwithstanding this, Lewis (2005) argued that it would appear that traditional values have remained: trust in authority, faithfulness to one’s social group, patriotism, and a highly developed sense of citizenry. Välijärvi et al. (2002) and Sahlberg (2007) both described the Finnish people as collectively having positive dispositions towards education, explaining that Finnish society has experienced comparative ease in reaching mutual understandings on education policy and systems, and attributes this to the cultural homogeneity in Finland.

Finnish education has not historically been a topic for political debate and Sahlberg (2007) explained that the underpinning educational values have remained basically unchanged since the late 1960s and that the Finnish schooling system has not been swayed by global education reform trends. Drawing comparison between Finnish education and the rest of the world, Sahlberg explained that where centrally prescribed standards have been adopted by other nations, the Finnish system has opted for flexibility and loose standards. Moreover, Sahlberg contrasted the global focus on literacy and numeracy with a broad learning combined with creativity approach in Finland. In reference to the global trend of
consequential accountability, Sahlberg (2007) described the Finnish system as employing intelligent accountability with trust-based professionalism. This collectivist approach is reflected in the government’s commitment to education, adopting a development plan every four years that is in line with the European Union Lisbon strategy, as seen on the Finnish Ministry of Education website (http://www.minedu.fi/OPM/Linjaukset_ja_rahoitus/?lang=en). Broadly, the Ministry’s goals are quality, efficiency, equity and internationalism, with the overall aim of promoting sustainable economic development and the competitiveness of the Finnish welfare society.

To the Finns, education, culture and democracy are inseparable, and this is evident in their practice. Lie et al. (2003) were of the opinion that an unequal distribution of education, particularly reading literacy, poses a serious problem for democratic nations. This belief reflects the Finnish approach to education, where the right to education is specified in their constitution:

“Everyone has the right to basic education free of charge. Provisions on the duty to receive education are laid down by an Act.

The public authorities shall, as provided in more detail by an Act, guarantee for everyone equal opportunity to receive other educational services in accordance with their ability and special needs, as well as the opportunity to develop themselves without being prevented by economic hardship.

The freedom of science, the arts and higher education is guaranteed.” (The Finnish Government, 1999).

By contrast, Austin’s (1965) historical account of education in Australia, from as early as 1788, described the establishment of formalised education as being fraught with
contention and debate. Moreover, Bonner and Caro (2007) argued that contention and debate continue to reign in the 21st century, and is evident in public dispositions towards education. Essentially, three contending views of the world disembarked from the first fleet—the protestant, the catholic and the enlightenment (Austin, 1965; Bonner & Caro, 2007). Austin (1965) explained that the thirty-six colonial children who arrived with the First Fleet were either the children of convicts or marines and educating the poor labouring class was treated with great suspicion. Coming from the class system of England, the education of the poor was considered a means of spreading religious dissension and was treated with distrust. Education was preserved for the wealthy and upper classes. Nonetheless, Austin (1965) credited the early governors with educating the young, however poor or low they may have been; a decision that contradicted English society, but was based on the belief that the future of the children was essentially the future of the English colonies in Australia. Similar to Finnish history, churches in Australia took up the responsibility of educating the young during the fledgling years of colonisation. Nevertheless, Bonner and Caro (2007) reported that no matter how well intended, education was a contentious political, financial and religious issue, and remained so for many decades.

By 1833 education was the responsibility of the colonies. This brought about new challenges, as many feared the propagation of religions different to their own. By 1895, the six colonies had passed Education Acts specifying secular education. Austin (1965) described the upheaval that free, compulsory and secular education brought, as many believed that the State had no more right to interfere with education, than it did with religion and considered it a waste of public money. The idea of free education also encountered considerable opposition from liberals, shunning the burden of taxation upon men owning property. Overall, opposition to compulsory clauses in the State Education Acts was so
strong that it was not until the twentieth century that effective compulsory schooling systems emerged (Austin, 1965). To this day formal schooling in Australia resides with multiple authorities and with divided responsibility comes differing approaches to education. Although the state and federal governments have increasingly introduced common definitions, guidelines and standards, Australian education boasts diversity to this day. Furthermore, Bonner and Caro (2007) also attributed the diversity of dispositions towards education in Australia to history.

When compared to Finnish society, Australian society does not have such a unified approach to education. Although the federal government has developed national goals for compulsory schooling, the responsibility for education lies with the states and territories. As a result nationwide equity or quality across Australia’s larger geographical expanse has not yet been achieved, as is the case in Finland, albeit in a much smaller physical area. However, there is a growing consensus towards a set of common goals, and in an attempt to foster nationwide standards the federal government has linked funding to its articulated national goals. The first set of national goals, The Hobart Declaration, was developed in 1984 but was later superseded by the Adelaide Declaration on National Goals for Schooling in the Twenty-first Century. Currently, the Melbourne Declaration on Educational Goals for Young Australians (2008) is in use (Appendix).

2.4.2.2 The right to education in Finland and the business of education in Australia: the public versus private debate

As explained in this section, this review has found considerable evidence to suggest that the different approaches to education in the two countries have impacted societal
dispositions towards education—both the split of public and private education in Australia and the homogenous system in Finland. The Finnish Ministry of Education considers it the responsibility of public authorities to secure equal educational opportunities for every resident in Finland, irrespective of financial standing or other factors (http://www.minedu.fi/OPM/Linjaukset_ja_rahoitus/?lang=en). As a result, most education is free, including pre-primary schooling and post-graduate places. Finnish education is funded by the Ministry of Education and administered by municipalities. The majority of Finnish students are enrolled in public (comprehensive) schools (OECD, 2004). The small minority of private schools are subject to public supervision and must provide education that meets the same standards. In the 2006 PISA study, only three per cent of 15 year-old Finnish students were enrolled in privately managed schools (OECD, 2007). Figure 2.4 gives a brief outline of the Finnish education system.
Välijärvi et al. (2002) believed that Finnish education had been exceptionally successful in achieving equity by removing obstacles to learning. For example, they explained that the Finnish system prioritised educational accessibility and where geographical limitations exist transport costs are borne by the system in order to ensure the quality of education and student opportunities across Finland are fairly uniform, regardless of whether or not students are of rural or urban residence (Lie et al., 2003; Välijärvi et al., 2002). This equity focus is also evident in the heterogeneous approach to schooling where students are not streamed until the approximate age of 16. However, Simola (2005)
challenged this claim to equitable and homogeneous education and argued that the Finnish success could in part be attributed to the homogenous composition of the Finnish society in general. Furthermore, Sahlberg (2007) flagged a possible transition in current Finnish society from traditional homogeneity to a more multicultural composition, as it seems to be attracting a greater migrant population. Nonetheless, the academic success of Finnish students remains outstanding and the national commitment to education is evident. In 2006, Finland boasted just over 3,500 comprehensive and upper secondary general schools and 20 universities for a population of 5.2 million people (Statistics Finland, 2007). Australia had close to double the number of schools and universities, with over 9000 schools and near 40 universities. However, the population of Australia was four times that of Finland, with just over 21 million people (Australian Bureau of Statistics, 2007).

Compulsory schooling in Australia (from age six to 15) is a mandate of the states and territories; however, privately funded schools in Australia have risen to account for close to 30% of the total number of schools and just over 30% of the student population (Australian Bureau of Statistics, 2007). This split of private and public contribution to education in Australia has resulted in educational choice and diversity in institutions. In a scathing assessment of schooling in Australia, Bonner and Caro (2007) argued that the egalitarian days are gone and that Australian society has undergone a paradigm shift from the view that education is for the common good to the belief that it is a provider of positional advantage for individuals. Bonner and Caro (2007) argued that this shift in values has resulted in an increased desire for private schooling even though it is unaffordable to many. They further suggested that public schooling has consequently suffered. However, in previous literature Donnelly (2004) argued that parents may be choosing non-government schools to escape the negative impacts of educational bureaucracy in government schools. To compound the
situation, although non-government schools receive substantial government funding, private contribution in Australia is significant and widely acknowledged as vital to the education economy. Therefore, to some extent, schools contend for their market-share in Australia and education has somewhat developed into competitive business. The OECD’s 2007 report on PISA 2006 ranked Australian students amongst those belonging to countries with the highest choice in schools, with more than 80% of 15 year-olds attending schools where principals report the close proximity of at least two other schools as optional alternatives. Bonner and Caro (2007) argued that such freedom of choice has led to anxiety as choice of school in Australia denotes social status. Considering the context of this research problem, the option of freedom of choice in Australia is intriguing. It may be possible that parents choose a school that best reflects their family’s and children’s dispositions towards learning.

The structures of education systems in Australia vary between states and territories. Generally, students begin a non-compulsory preparatory year at age five and enter compulsory schooling at approximately age six. Compulsory schooling includes primary school and high school education up to the age of 15. Around 12 years of age, students transfer from primary school to secondary school, and matriculation from senior high school occurs at the approximate age of 18. Some schools offer an alternate structure including middle school, where the junior years of high school education are uniquely separate from senior high schooling. Prior to the formalised preparatory year of schooling, infant care and education operates by a ‘user-pays’ system, with means-tested government assistance available to families. Tertiary education, whether it is vocational or academic, also relies upon the ‘user-pays’ approach, although fees for Australian citizens are subsidised by the government. Although Australian governments have historically been highly supportive of education, the contribution of the private sector is critical to the education economy. This
Differences between Australian and Finnish student dispositions

Decentralised economic approach results in budgetary decision-making power resting with multiple authorities, making for greater diversity, but also making issues of equity more difficult to grapple with.

To this end, dispositions toward education in Australia may reflect the belief that education functions as a ladder to social status, where those who climb higher are the privileged, or the talented who earn their status amongst the privileged. Teese and Polesel (2003) produced strong evidence to support their belief that schools encourage economic marginalisation or advancement in Australia, arguing that the middle class and poor are disadvantaged and the culturally rich are favoured. In their work, Bonner and Caro (2007) lamented the state of Australian education, arguing that public schooling had suffered at the hand of the private sector. Nonetheless, diversity in Australian education is a by-product of a pluralistic, multicultural society and has been embraced by academics (Robinson & Diaz, 2005). Not only are there private and public schools, there are also schools of different educational philosophies, cultures, religions, and specialist learning areas. While freedom of choice and diversity are valued in a democratic society, there may be an argument that these features can have detrimental effects at the broadest level.

2.4.2.3 Autonomy vs. centralisation

It should be noted that the unified commitment to equity in Finland does not correspond to centralisation of power in curriculum administration (OECD, 2007; Välijärvi et al., 2002). The Finnish schooling system could be described as ‘low definition, high professionalism’; where teachers are highly trained, their professionalism celebrated, and as a result the curriculum is less centrally directed. In general, schools operate autonomously
and so do teachers. Lerkkanen (2007) argued that this has meant that teachers have had to become pedagogical professionals, which is discussed in greater detail in the next section. Sahlberg (2007) described the Finnish approach as intelligent accountability where trust amongst students, teachers, school leaders and education authorities is paramount. He explained that the only crucial standardised test is the Matriculation Examination at the end of general upper secondary school and that law prohibits issuing grades in primary school. Sahlberg argued that this approach promotes a strong sense of professional initiative and responsibility. Notwithstanding this, the Ministry of Education is the governing body and is responsible for ensuring equity across the nation. Therefore, clear national vision is articulated and directives are provided. However, in the early 1990s the Finnish system made a significant paradigm shift in philosophy and practice, moving away from a highly structured, somewhat textbook based system, to adopt a more flexible school-based approach (Välijärvi et al., 2002). The 2006 PISA data (OECD, 2007) confirmed the higher autonomy in the Finnish schools by showing their low percentage of students in schools where academic data was posted publicly to be used for evaluation of principal and teacher performance, or used for decisions about instructional resource allocation. By contrast, Australian schools had higher percentages in this regard.

Comparatively, the Australian states are moving towards high definition curricula, which is at risk of diminishing the professional role of teachers (a discussion about teacher status follows below). This is concerning to some as research has shown links between autonomy and performance. For example, the OECD (2004) suggested that in the countries where principals report higher degrees of autonomy in school management, the average performance in mathematics also tends to be higher. Donnelly (2004) described Australian schools as a ‘one-size fits all’ approach, and campaigned for more freedom for schools so
they can better meet the needs of their communities. He argued the benefits of greater involvement of parents and communities in decision-making processes for schooling, so that the wider community could be granted more autonomy. Autonomous schooling in its truest form also means autonomous teaching. Dondero’s (1997) research found that giving teachers autonomy led to job ownership and empowerment as workers endeavoured to grow and seek more responsibility. A review of literature pertaining to teacher status and its effect upon dispositions follows below.

2.4.2.4 Teacher status in society

As this research project is concerned with student dispositions toward learning, a discussion about the societal status of teachers is warranted. Vick (1998) offered a negative historical account of the status of the teaching profession in Australia. Although he acknowledged the efforts of some to promote the profession as vital in the care and shaping of children, he claimed that many take up the occupation of teaching as a last resort. Vick argued that the government-employee status of teachers denies them the possibility of respect similar to doctors, and he compounded this argument by describing private employees as social inferiors to the client groups of elite schools. Nevertheless, Vick also acknowledged improving social respect towards the teaching profession in Australia, although negative history and ongoing negative press tarnish it. By contrast, Rice (2005) believed that on the whole the Australian public values teachers, but that teachers don’t value themselves. Research from the University of Cambridge has shown that teachers can gain a sense of positive status through collaborative work with other professionals and when they feel trusted by parents (Hargreaves, Cunningham, Hansen, McIntyre, Oliver & Pell, 2007). The issue of parental trust again raises the issue of school choice and dispositions
towards education as research suggests that Australian parents have lost faith in schooling, which may in part be caused by increasing centralisation, high curriculum definition and lower teacher professionalism (Donnelly, 2004).

It would seem that this is strikingly different to the experience in Finnish society. Välijärvi et.al (2002) described the teaching profession as revered, trusted and important within Finnish society. Consequently, considerable pedagogical independence and autonomy is granted to Finnish teachers. Further, Välijärvi et.al (2002) explained that post-secondary students in Finland also valued highly the profession of a classroom teacher, with only 10% of applicants for teacher training programmes at universities accepted (Sahlberg, 2007). Therefore, Finnish universities can admit the highest performing applicants. This is very different from reported teacher shortages and low entry scores to teacher training in Australia (Courier Mail, 2009; OECD, 2007).

The aim of Finnish teacher education is to prepare pedagogical professionals with the capabilities to develop their own work, classrooms, and schools (Lerkkanen, 2007). Westbury, Hansen, Kansanen and Bjorkvist (2005) and Jussila and Saari (2000) believed that Finnish teacher education is distinguished by its depth and scope. Finnish teachers undertake five years of teacher education provided by universities, which leads to the completion of a Master’s thesis, which is the minimum requirement for teachers of basic education. Nonetheless, many pre-school teachers have only a bachelor’s degree in early childhood education. Due to the equity policy in Finland, Finnish teachers also need to be trained in special education as only about two per cent of students attend special schools. In practice, students experiencing difficulty may have opportunity to study in a smaller group once or twice a week, or receive the support of specialists, but the overall approach is
inclusion. Conversely, education pedagogy for teaching gifted and talented students has received less attention in Finnish education (Välijärvi et al., 2002). In order to incorporate gifted education, Välijärvi et al. (2002) argued that Finnish teachers must be equipped with the skills to cope with greater differentiation within classes and advance towards pedagogy that gives greater attention to individuality, esteem, and self-regulation in order to foster deeper critical analysis.

Vick (1998) reported that Australian teacher education evolved from little or no training before and after the World Wars, to differing levels of training from teachers’ colleges in the 1970s. It was not until the late 1980s that universities assumed the mandate of teacher education, extending courses to three years, and then to four years in the 1990s. To become a qualified teacher in Australia today, an individual must complete a four-year bachelor degree in education, or a one-year graduate diploma in education following a bachelor degree in another field. University programmes for teacher training usually comprise a combination of discipline/curriculum-related subjects and pedagogy with practical experience components throughout the course. The nature and composition of teacher education courses varies between universities. Graduates need to register with the appropriate governing body in their state or territory before they can teach and some employers have their own selection processes that may require the applicant to satisfy further criteria.

Välijärvi et al. (2002) believed that the status of educators clearly affects the perceived value of education. Stated differently, the respect society affords teachers reflects its disposition towards learning. As the Brickman and Miller (2001) model has shown, an
individual’s perceptions are influenced by wider societal contexts, or for the purpose of this project, student dispositions are influenced by societal dispositions.

2.5 Indicators for measuring students’ dispositions

This review so far has discussed the literature surrounding the impact of socio-cultural contexts upon student dispositions and explored these factors as facets of a student’s disposition: personal values and perceived task value and importance; knowledge of possibilities and perception of obstacles; learning strategies; self-concept; self-efficacy; and motivation and moving toward personal future goals.

Now with a better understanding of the interrelated nature of the above components and the likely effects of home and school environments, this review will address the literature that helps to identify key operational indicators that can be used to measure student dispositions. At this point, it must be acknowledged that the Brickman and Miller (2001) model is somewhat limited. Although it has proven useful for conceptualising the effects of student dispositions upon performance, it does not identify operational indicators for these dispositions. Indicators are vital to this project if measurement and comparison of dispositions is to occur. Therefore, by reviewing current literature in a search for useful indicators of student dispositions, five indicators were identified and are explained and referenced below. The first two indicators measure the influence of the home background upon a student’s disposition towards learning. The last three are concerned with measuring students’ personal dispositions. The five indicators are as follows: parental education levels; frequency of student-parent dialogue; student ratings of the importance of doing well; student ratings of interest and enjoyment; and student ratings of effort.
2.5.1 Indicator 1: Parental education levels

Much research supports the view that the home environment influences the personal values of school students and their motivation to achieve future goals (Demaray & Malecki, 2002; Demaray, Malecki, Davidson, Hodgson & Rebus 2005; Flouri, Buchanan & Bream, 2002, Gonzalez-DeHass et al., 2005; Marcon, 1999; Miedel & Reynolds, 1999; Paulson, 1994). As discussed in Section 2.4.1, this research has identified the strong influences of parental aspirations for the education of their child and their own educational achievements upon a student’s academic performance, emotional adjustment and dispositions towards school. Accordingly, parental education levels become the first indicator of student dispositions.

2.5.2 Indicator 2: Frequency of student-parent dialogue

The second indicator that measured the influence of the home upon student dispositions towards learning was student-parent dialogue. Metcalfe and Game (2006) believed that learning is a dialogic encounter, either between the student and another person or between the student and a text like a book, a game or a tangible routine. They explain that the ‘dia-’ in dialogue does not mean two, but through, describing a process that occurs through logic. For example, Socrates insisted that he was not teaching people, but rather engaging in dialogue and asking questions of them and himself (Metcalf & Game, 2006). This research highlights the value of student-parent dialogue, as it occurs outside structured curricula and organisation of a school system.
2.5.3 **Indicator 3: Student ratings of the importance of doing well**

Research has identified the importance of doing well at school as an indicator of students’ personal dispositions in terms of motivation to move towards personal goals, personal values and perceived task value (Brickman & Miller, 2001; McInerney & McInerney, 2006; Porter, 2007), as previously discussed in Sections 2.3.2 and 2.3.7. It complements the other disposition indicators below—ratings of interest, enjoyment and effort—but stands out as a direct measure of values and motivation in relation to performance, as illustrated in the Brickman and Miller model (2001). Sylva (1994) explained that developmentally, motivation evolves from the early childhood satisfaction of personally mastering a skill to a more competitive, comparative performance orientation by the time a person reaches adolescence. Research has shown that this metamorphosis typically occurs during middle childhood when children are constructing increasingly complex webs of self-concept, and the development of academic self-concept seems to mediate between achievement behaviour and motivation (Blumenfeld, 1992; Guay, Marsh & Boivin, 2003; Sylva, 1994; Zimmerman & Schunk, 2001). The importance of doing well at school serves to measure achievement behaviour as an indicator of student dispositions.

2.5.4 **Indicator 4: Student ratings of interest and enjoyment**

The next indicator for measuring students’ personal dispositions was interest and enjoyment in learning which is reflective of self-related beliefs, personal values, the value of the task, learning strategies and their motivation to move toward personal goals (Fay, 2001; Porter, 2007; Rutter, 1983). Rutter (1983) believed good outcomes to be associated with students wanting to participate and be involved in the learning process. Similarly, Porter
(2007) proposed that motivation to achieve personal goals is associated with high levels of engagement. One of the key concerns of educators is the role education has in fostering or dampening a love for learning and education (McInerney & McInerney, 2006). Fay’s (2001) research showed that if a student found schoolwork to be meaningful, he or she would be more likely to succeed. For schoolwork to be meaningful there must be connections between their personal lives, future goals and school performance. Further, interest and enjoyment in learning have strong links with effort (Fay, 2001; Porter, 2007; Rutter, 1983). For the purpose of this project effort was an indicator in its own right as discussed below.

2.5.5 Indicator 5: Student ratings of effort

The fifth indicator of students’ personal dispositions was effort, which for the purpose of this project, measures motivation, self-concept, self-efficacy, and knowledge of possibilities and obstacles. The Brickman and Miller model (2001) (Figure 2.1) does not include effort but the following research explains its link to performance and its role as an operational indicator of student dispositions. Elliot, Hufton, Willis and Illushin (2005) explained that students’ educational values have a direct impact upon effort, but they are variable between cultures. Porter (2007) argued that effort, which is strongly linked to motivation, is affected by expectations of success, the benefits of success and social context. This explanation agrees with the Brickman and Miller (2001) model and confirms the interrelatedness of success, context, and motivation, which is operationalised by effort.

Porter (2007) further explained that both mastery and performance goal orientations result in similar engagement and effort. However, the risk with performance-oriented students is that their engagement may only last as long as their self-esteem is intact. Should
they perceive themselves as at risk of failing their effort and consequently their performance is likely to plummet. They may shift their labours to task avoidance for the sake of self-preservation. On the other hand mastery-oriented students are more likely to persevere regardless of the wider context in order to acquire skills or competence. Fay (2001) explained that these students believe that effort results in ability, and are more likely to increase persistence if confronted with failure. This orientation is more concerned with personal progress where effort is rewarded within a personal context rather than class-wide competition. “Effort will surpass talent when talent makes no effort” (Porter, 2005, p. 220).

Considering the influences of the home in shaping student dispositions previously mentioned in Section 2.4.1, effort was also used to measure self-concept, self-efficacy, and knowledge of possibilities and the ability to overcome obstacles. Students who come from high SES backgrounds are more likely to understand the options available to them and invest effort accordingly. Furthermore, Porter (2007) would have agreed that effort is a product of self-efficacy as taking responsibility for one’s own actions is more likely to result in investing effort and striving for success. In practice the link between self-related beliefs and effort might be seen in a perseverant, persistent and reflective learner.

2.6 Conclusion

This review critiqued research pertaining to student dispositions using Brickman and Miller’s (2001) model of socio-cultural impacts upon future goals and self-regulation as a framework. The model identified multiple factors that ultimately affect performance, and collectively this project referred to these factors as “student dispositions”. The review of
literature found that the facets of student dispositions (personal values and perceived task value and importance, knowledge of possibilities and perception of obstacles, learning strategies and the importance of reading, self-concept, self-efficacy, and motivation and movement towards personal future goals) are interrelated and interdependent. The Brickman and Miller (2001) model proved useful for developing the review to this point. However, it was found to be limited when this research study sought suitable indicators for measuring student dispositions, as was a requirement for quantitative research methods. Consequently, further review of literature identified suitable indicators for measurement purposes. To this end, not only was the Brickman and Miller (2001) model found to be limited, gaps in current knowledge appeared concerning the comparison of the two countries. Therefore, taking elements from the Brickman and Miller model, a new complementary model was designed for the specific purpose of comparing Australian and Finnish student dispositions in this research project. This new model (Figure 2.5) was developed to show the relationships between the six facets of student dispositions and the five indicators used to measure student dispositions. The new model was not designed to replace the Brickman and Miller model, but rather was an accompaniment so that research could be conducted to satisfy the gaps in knowledge about differences between Australian and Finnish student dispositions.
Figure 2.5. Student dispositions affecting performance and their indicators and influencing socio-cultural contexts

With reference to the research question posed in this study, a review of literature did not indicate conclusive answers. It validated relationships between student dispositions and performance and the connections between the facets of student dispositions, and also
considered influences from wider socio-cultural contexts, namely home and school environments. However, there is not enough evidence in current literature to conclude whether or not Australian and Finnish student dispositions towards learning differ, and if indeed there are differences, how these affect performance. Therefore, the outcome of this review was to use the proposed model in Figure 2.5 as a framework for guiding the measurement of student dispositions to determine whether or not there are differences between Australian and Finnish student dispositions towards learning, and if so whether there are links between differences in dispositions and known differences in performance between the two countries. To this end, this proposed model was tested by this project and its validity is discussed in Chapter 7. Moreover, as this project took particular interest in the OECD’s PISA studies, further analysis of PISA specific literature was undertaken and is documented in the next chapter.
3.0 STUDENT DISPOSITIONS IN THE PISA CONTEXT

3.1 Introduction

This chapter is supplementary in nature and a little unconventional for an academic thesis. However, it seemed essential to include a review of PISA literature as a precursor for the coming chapters that explain research methods and results. In summary, Chapter 1 introduced the research problem, established its context and posed the question: *Are there differences between Australian and Finnish school students’ dispositions towards learning, and if so, are there links between differences in dispositions and known differences in performance?* Subsequently, Chapter 2 reviewed current literature pertaining to student dispositions and their links to performance and found there to be inadequate research specific to Australian and Finnish students to satisfactorily answer the research question. Having identified this gap in knowledge, Chapter 4 outlines the research design, methodology and research methods to address the question. In short, the methodology has chosen to use the data provided by the Organisation for Economic Cooperation and Development’s (OECD’s) Programme for International Student Assessment (PISA), and the indicators as discussed in Chapter 2 to further analyse student dispositions. Therefore, as a preamble to the research methods chapter that follows, it is necessary to insert this chapter to establish the context of PISA with an express focus on what is already known about Australian and Finnish students. Discussion will take place under the following headings: the history of PISA; Australian and Finnish performance in PISA; differences found by PISA
regarding socio-cultural environments; known differences in student dispositions; and conclusions.

3.2 The history of PISA

The OECD carries out the PISA study every three years to monitor international student performance levels. Targeting students who are close to the end of their compulsory schooling (approximately 15 years of age in the majority of participating countries), PISA uses a combination of assessment and survey techniques to identify how students approach learning while simultaneously measuring how well they perform in the common scholastic areas of reading, mathematics and science. The first study was conducted in 2000 and had a particular focus on reading literacy. The 2003 study predominantly focused on mathematical literacy with the added assessment area of problem solving, and the 2006 study in turn focused upon scientific literacy.

It is evident by the increasing number of participating countries in the programme that PISA plays a prominent role within the international education community. To date, well over a million students have been assessed, providing an unprecedented knowledge base about education systems measured over time (OECD, 2007). Alongside the data collection in the literacy areas of reading, mathematics and science, is a collection of data relating to students, schools and families and their cultural backgrounds. This data has been used to explain differences between and within countries, and has been made available publicly.
Led by an expert team from the OECD, decisions about the scope and nature of data collection are informed by educational professionals from participating countries and guided by their governments in order to best satisfy current policy-related information needs. Further, it is the position of the OECD that extensive measures are taken to ensure cultural breadth and balance, and a high level of quality assurance in translation, sampling and collection of data (OECD, 2004). Nevertheless, much research exists on the problematic nature of translating texts between cultures (Arffman, 2007; Hambleton, 2002; Sulkunen, 2007). Arffman (2007) specifically listed the most typical problems encountered in translating international comparative studies to be: language specific differences in grammar, language-specific differences in meaning, differences in culture and conventions, quality of source text, question format, behaviour of translators, lack of qualified translators and lack of time. This project gives due consideration to these problems and conducts comparative analysis between the two countries in terms of majorities and minorities of responses from Australian and Finnish students, forsaking specific nominal data when drawing conclusions.

PISA assesses three core academic literacies. The definitions belonging to these literacies have experienced some evolution during the course of the three rounds of assessment, especially at the time when a particular literacy area becomes the focus of study. Therefore, for the purpose of this report the definitions provided are taken from the year when each particular literacy was of primary focus.

Reading Literacy - 2000:

“The ability to understand, use and reflect on written texts in order to achieve one’s goals, to develop one’s knowledge and potential, and to participate effectively in society” (ACER’s report on PISA 2000, Lokan et al., 2001, p. 8).
Mathematical Literacy - 2003:

“...an individual’s capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments and to use and engage with mathematics in ways that meet the needs of that individual’s life as a constructive, concerned and reflective citizen” (OECD, 2004, p. 57).

Scientific Literacy - 2006:

“An individual’s:

• Scientific knowledge and use of that knowledge to identify questions, to acquire new knowledge, to explain scientific phenomena, and to draw evidence-based conclusions about science-related issues.

• Understanding of the characteristic features of science as a form of human knowledge and enquiry.

• Awareness of how science and technology shape our material, intellectual and cultural environments.

• Willingness to engage with science-related issues, and with the ideas of science, as a reflective citizen.” (OECD, 2007, pp. 34-35).

The term ‘literacy’ in PISA is not restricted to competence in language use, but refers to an ability to flexibly employ knowledge in a range of situations (OECD, 2001). To this end PISA aims to collect information pertaining to students’ skills in life-long learning. (The concept of life-long learning has already been reviewed Chapter 2). Moreover, each literacy area in PISA has three main facets: conceptual knowledge, processes, and contextual application (Lokan et al., 2001). As an example, below is a table summarising the areas of curricular assessment taken from the OECD’s report (2004) on PISA 2003.
### Table 3.1.

**Areas of curricular assessment in PISA 2003**

<table>
<thead>
<tr>
<th>Assessment Area</th>
<th>Mathematics</th>
<th>Science</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition and its distinctive features</strong></td>
<td>“The capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgements and to use and engage with mathematics in ways that meet the needs of that individual’s life as a constructive, concerned and reflective citizen” (OECD, 2003e). Related to wider, functional use of mathematics, engagement requires the ability to recognise and formulate mathematical problems in various situations.</td>
<td>“The capacity to use scientific knowledge, to identify scientific questions and to draw evidence based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity” (OECD, 2003e). Requires understanding of scientific concepts, an ability to apply a scientific perspective and to think scientifically about evidence.</td>
<td>“The capacity to understand, use and reflect on written texts in order to achieve one’s goals, to develop one’s knowledge and potential, and to participate in society” (OECD, 2003e). Much more than decoding and literal comprehension, reading involves understanding and reflection, and the ability to use reading to fulfil one’s goals in life.</td>
</tr>
</tbody>
</table>
| **Content dimension** | Clusters of relevant mathematical areas and concepts:  
• quantity;  
• space and shape;  
• change and relationships; and  
• uncertainty. | Areas of scientific knowledge and concepts, such as:  
• biodiversity;  
• forces and movement; and  
• physiological change. | The form of reading materials:  
• continuous materials including different kinds of prose such as narration, exposition, argumentation; and  
• non-continuous texts including graphs, forms, lists. |
| **Process Dimension** | “Competency clusters” define skills needed for mathematics:  
• reproduction (simple mathematical operations);  
• connections (bringing together ideas to solve straightforward problems); and  
• reflection (wider mathematical thinking). In general these are associated with tasks of ascending difficulty, but there is overlap in the rating of tasks in each cluster. | The ability to use scientific knowledge and understanding, to acquire, interpret and act on evidence:  
• describing, explaining and predicting scientific phenomena;  
• understanding scientific investigation; and  
• interpreting scientific evidence and conclusions. | Type of reading task or process:  
• retrieving information;  
• interpreting texts; and  
• reflection and evaluation of texts. The focus of PISA is on reading to learn, rather than learning to read, and hence students are not assessed on the most basic reading skills. |
| **Situation Dimension** | Situations vary according to their distance from individuals’ lives. In order of closeness:  
• personal;  
• educational and occupational;  
• local and broader community; and  
• scientific. | The context of science, focusing on uses in relation to:  
• life and health;  
• the Earth and the environment; and  
• technology. | The use for which the text constructed:  
• private (e.g., a personal letter);  
• public (e.g., an official document);  
• occupational (e.g., a report);  
• educational (e.g., school related reading). |

3.3 Comparable performances of Australian and Finnish students in PISA

To date the PISA data has shown that Australian students perform quite well on an international scale, ranking well above the OECD average in all three literacy areas in all three rounds (OECD 2001, 2004, 2007). However, there has been an outstanding trend in all three studies: Finnish students top the academic charts in the majority of assessable areas (McGaw, 2008), as illustrated in Figures 1.1 and 1.2 and Tables 1.1-1.3 in Chapter 1. Finnish students have consistently performed above the OECD averages and taken a particularly outstanding lead in reading literacy (OECD, 2001, 2004, 2007). As all three literacy areas are divided into sub-categories for assessment, clearly ranking countries in a holistic fashion has proven problematic. However, due to the clear lead of the Finnish students, it is possible to summarise their international rankings, shown in Table 3.2. It can be seen from this table that the performance of Finnish students has steadily improved over the three assessment periods. In reference to the PISA studies, Sahlberg (2007) believed that Finnish students learn well in comparison with their international counterparts.

Table 3.2.

*International rankings of Finnish students by mean scores in PISA studies*

<table>
<thead>
<tr>
<th>Year</th>
<th>Reading literacy rank</th>
<th>Scientific literacy rank</th>
<th>Mathematics literacy rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 (32 countries)</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2003 (41 countries)</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2006 (57 countries)</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

(Tuovinen, 2009, p. 52).
By way of explanation, as discussed in Section 2.4.2 about the Australian and Finnish schooling systems, students in the samples from both countries would have been near the end of their compulsory comprehensive schooling, but not yet of an age where vocational or theoretical paths had been chosen.

### 3.3.1 Performance in reading literacy (focus on PISA 2000)

This section about reading literacy has two main parts: firstly, an explanation of what is involved in the reading literacy assessment domain, and secondly a comparison of Australian and Finnish performances. The explanation of reading literacy has drawn heavily upon literature from PISA 2000 as reading was of prime focus that year.

Reading-based questions in PISA included continuous texts (like narratives and expositions) and non-continuous texts (like lists and diagrams). Students needed to understand the use for which a text was constructed and demonstrate an ability to read to learn (OECD, 2001). Such ability was assessed by three components in the reading literacy scale: retrieving information, interpreting texts, and reflecting on and evaluating texts. Item response theory techniques were used for the reading literacy results, and proficiency levels were developed for these three macro-processes, Level 5 being the highest and Level 1 being the lowest, shown in Table 3.3.
Table 3.3.

*Proficiency levels in the PISA reading literacy scale*

<table>
<thead>
<tr>
<th>Level</th>
<th>Retrieving information</th>
<th>Interpreting texts</th>
<th>Reflection and evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Locate and possibly sequence or combine multiple pieces of deeply embedded information, some of which may be outside the main body of the text. Infer which information in the text is relevant to the task. Deal with highly plausible and/or extensive competing information.</td>
<td>Either construe the meaning of nuanced language or demonstrate a full and detailed understanding of a text.</td>
<td>Critically evaluate or hypothesise, drawing on specialised knowledge. Deal with concepts that are contrary to expectations and draw on a deep understand of long or complex texts.</td>
</tr>
<tr>
<td>4</td>
<td>Locate and possibly sequence or combine multiple pieces of embedded information, each of which may need to meet multiple criteria, in a text with unfamiliar context or form. Infer which information in the text is relevant to the task.</td>
<td>Use a high level of text-based inference to understand and apply categories in an unfamiliar context, and to construe the meaning of a section of text by taking into account the text as a whole. Deal with ambiguities, ideas that are contrary to expectation and ideas that are negatively worded.</td>
<td>Use formal or public knowledge to hypothesise about or critically evaluate a text. Show accurate understanding of long or complex texts.</td>
</tr>
<tr>
<td>3</td>
<td>Locate, and in some cases recognise, the relationship between pieces of information, each of which may need to meet multiple criteria. Deal with prominent competing information.</td>
<td>Integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. Compare, contrast or categorise taking many criteria into account. Deal with competing information.</td>
<td>Make connections or comparisons, give explanations, or evaluate a feature of text. Demonstrate a detailed understanding of the text in relation to familiar, everyday knowledge, or draw on less common knowledge.</td>
</tr>
<tr>
<td>2</td>
<td>Locate one or more pieces of information, each of which may be required to meet multiple criteria. Deal with competing information.</td>
<td>Identify the main idea in a text, understand relationships, form or apply simple categories, or construe meaning within a limited part of the text when the information is not prominent and low-level inferences are required.</td>
<td>Make a comparison or connections between the text and outside knowledge, or explain a feature of the text by drawing on personal experiences and attitudes.</td>
</tr>
<tr>
<td>1</td>
<td>Take account of a single criterion to locate one or more independent pieces of explicitly stated information.</td>
<td>Recognise the main theme or author’s purpose in a text about a familiar topic, when the required information in the text is prominent.</td>
<td>Make a simple connection between information in the text and common, everyday knowledge.</td>
</tr>
</tbody>
</table>

(OECD, 2001, p. 36).

Figure 3.1 shows the trends of the combined reading performances of Australian and Finnish students over the three data collection periods. Finnish students clearly maintained excellent reading performance levels over time, whereas the performance of Australian students has declined in the most recent studies.
Lie et al. (2003) explained that Finnish students performed well on the most difficult tasks, specifically retrieving information from expository texts and from texts not written for a young adult audience. Nevertheless, the area of weakness amongst Finnish students was reflection, as it seems they demonstrated a degree of difficulty in expressing opinions (Lie et al., 2003). In PISA 2000 where reading was the prime focus Finnish students scored better than Australians in interpreting texts and retrieving information, but Australian students performed more highly in reflecting/evaluating (Lokan et al., 2001).

There is no single factor that can explain the success of Finnish students. Nevertheless, of particular note is that on the combined reading literacy scale, particularly the measure of control strategies, the distance between the top and bottom student cohorts in Australia was significantly wider than that in Finland (Artelt et al., 2003). A narrower gap between Finnish students has produced higher mean scores. There have been various reasons

---

**Figure 3.1.** Trends in reading performance

![Graph showing trends in reading performance for different countries between PISA 2000, 2003, and 2006.](image)
given for this narrower gap: for example, Sulkunen (2007) suggested that the Finnish approach to reading literacy is in many ways consistent with the PISA definition of reading literacy. Nevertheless, conclusions from the first PISA study indicated that research needed to look beyond education systems to societal factors. For example, Artelt et.al (2003) explained that reading as a cultural practice is influenced by societal context; therefore classroom practice will not be the only answer for implementing positive improvements.

Worthy of mention is the effect that students’ native languages have upon reading performance. Overall, it seems that English-speaking countries performed highly on the reading literacy scale. Rigorous translation methods were employed in the PISA study; however, the Australian Council for Educational Research (ACER) acknowledged that it may be likely that students from English speaking countries were more familiar with the kinds of assessment tasks used in PISA (Lokan et al., 2001). However this possibility did not affect the reading scores amongst Finnish students as Finnish was the primary language of 94% of Finland’s population and they scored significantly higher than English speaking countries in most aspects of the reading literacy scale.

3.3.2 Performance in mathematical literacy (focus on PISA 2003)

This section discusses the mathematical literacy area and explores the differences between Australian and Finnish performances. Discussion about this literacy area has been drawn from PISA 2003 as mathematical literacy was the main focus that year.
Mathematical content was organised into four scales: *space and shape, change and relationships, quantity,* and *uncertainty.* Finnish students showed their strongest performance on the *quantity* scale and Australians on the *uncertainty* scale (OECD, 2004). In addition to assessing students’ knowledge of mathematical content PISA also assessed different areas of mathematical competencies, which were arranged into three clusters: *reproduction, connections* and *reflection.* The *reproduction* cluster was concerned with reproducing, recollecting, and recognising practised knowledge and associated technical skills in order to process simple computations. The next cluster, *connections* advanced reproduction skills to solving problems that required more than routine skills but still occurred within familiar settings. The *reflection* cluster built upon the connections cluster. It required insight on behalf of the student and an ability to identify and link relevant knowledge to create solutions. Questions to assess mathematics content and competencies were framed within personal, educational or occupational, public and scientific mathematical situations. Mathematical literacy was assessed by the proficiencies shown in Table 3.4.
Table 3.4.

_Proficiency Levels in PISA Mathematical Literacy_

<table>
<thead>
<tr>
<th>Level</th>
<th>What students can typically do</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>At Level 6, students can conceptualise, generalise, and utilise information based on their investigations and modelling of complex problem situations. They can link different information sources and representations and flexibly translate among them. Students at this level are capable of advanced mathematical thinking and reasoning. These students can apply this insight and understanding, along with a mastery of symbolic and formal mathematical operations and relationships, to develop new approaches and strategies for attacking novel situations. Students at this level can formulate and precisely communicate their actions and reflections regarding their findings, interpretations, arguments, and the appropriateness of these to the original situations.</td>
</tr>
<tr>
<td>5</td>
<td>At Level 5, students can develop and work with models for complex situations, identifying constraints and specifying assumptions. They can select, compare, and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriately linked representations, symbolic and formal characterisations, and insight pertaining to these situations. They can reflect on their actions and can formulate and communicate their interpretations and reasoning.</td>
</tr>
<tr>
<td>4</td>
<td>At Level 4, students can work effectively with explicit models for complex concrete situations that may involve constraints or call for making assumptions. They can select and integrate different representations, including symbolic ones, linking them directly to aspects of realworld situations. Students at this level can utilise well-developed skills and reason flexibly, with some insight, in these contexts. They can construct and communicate explanations and arguments based on their interpretations, arguments and actions.</td>
</tr>
<tr>
<td>3</td>
<td>At Level 3, students can execute clearly described procedures, including those that require sequential decisions. They can select and apply simple problem-solving strategies. Students at this level can interpret and use representations based on different information sources and reason directly from them. They can develop short communications reporting their interpretations, results and reasoning.</td>
</tr>
<tr>
<td>2</td>
<td>At Level 2, students can interpret and recognise situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can employ basic algorithms, formulae, procedures or conventions. They are capable of direct reasoning and making literal interpretations of the results.</td>
</tr>
<tr>
<td>1</td>
<td>At Level 1, students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and to carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are obvious and follow immediately from the given stimuli.</td>
</tr>
</tbody>
</table>

Since 2003 when mathematics was the prime focus of PISA the mathematical performance of Finnish students has improved to take the international lead and the performance of Australian students has declined, as shown in Figure 3.2

*Figure 3.2. Trends in mathematical performance*

(McGaw, 2008, p. 10).

Again, Finnish students scored notably higher than Australian students in mathematical literacy, although unlike reading literacy Finland was not the highest scoring country overall in 2003. In the 2003 assessment, when mathematics was the prime focus, more than half of the Finnish student cohort was ranked at or above Level 4 (OECD, 2004). Furthermore, a smaller group of lower performers once again influenced the high averages of Finnish students with only six per cent scoring below the level defined as passable mathematics. The gap between the top and bottom quartiles in Australia was considerably
wider and Thomson, Cresswell and De Bortoli (2004) flagged the view that it is the lowest performing students who continue to raise concern in Australia.

### 3.3.3 Performance in scientific literacy (focus on PISA 2006)

Similar to the previous sections on reading and mathematical literacies, this section begins by explaining scientific literacy in the PISA context and then compares performances between Australian and Finnish students. PISA 2006 was the first year where scientific literacy was the prime focus so information about science was taken from that year and as a result adequate longitudinal trends cannot yet be established.

The PISA 2006 scientific competencies included: identifying scientific issues, explaining phenomena scientifically, and using scientific evidence. The OECD PISA report (2007) explains that questions were framed personally, socially and globally, and concerned various life situations. The content for scientific literacy was divided into two domains, knowledge of science and knowledge about science. Knowledge of science content included physical systems, living systems, earth and space systems, and technology systems. Knowledge about science content included: scientific enquiry and scientific explanations. As with the other literacy areas, proficiency levels were used to measure scientific literacy, as shown in Table 3.5.
Table 3.5.

**Scientific Literacy Proficiency Levels**

<table>
<thead>
<tr>
<th>Level</th>
<th>Lower score limit</th>
<th>Percentage of students able to perform tasks at each level or above (OECD average)</th>
<th>What students can typically do</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>707.9</td>
<td>1.3% of students across the OECD can perform tasks at Level 6 on the science scale</td>
<td>At Level 6, students can consistently identify, explain and apply scientific knowledge and knowledge about science in a variety of complex life situations. They can link different information sources and explanations and use evidence from those sources to justify decisions. They clearly and consistently demonstrate advanced scientific thinking and reasoning, and they demonstrate willingness to use their scientific understanding in support of solutions to unfamiliar scientific and technological situations. Students at this level can use scientific knowledge and develop arguments in support of recommendations and decisions that centre on personal, social or global situations.</td>
</tr>
<tr>
<td>5</td>
<td>633.3</td>
<td>9.0% of students across the OECD can perform tasks at least at Level 5 on the science scale</td>
<td>At Level 5, students can identify the scientific components of many complex life situations, apply both scientific concepts and knowledge about science to these situations, and can compare, select and evaluate appropriate scientific evidence for responding to life situations. Students at this level can use well-developed inquiry abilities, link knowledge appropriately and bring critical insights to situations. They can construct explanations based on evidence and arguments based on their critical analysis.</td>
</tr>
<tr>
<td>4</td>
<td>558.7</td>
<td>29.3% of students across the OECD can perform tasks at least at Level 4 on the science scale</td>
<td>At Level 4, students can work effectively with situations and issues that may involve explicit phenomena requiring them to make inferences about the role of science or technology. They can select and integrate explanations from different disciplines of science or technology and link those explanations directly to aspects of life situations. Students at this level can reflect on their actions and they can communicate decisions using scientific knowledge and evidence.</td>
</tr>
<tr>
<td>3</td>
<td>484.1</td>
<td>56.7% of students across the OECD can perform tasks at least at Level 3 on the science scale</td>
<td>At Level 3, students can identify clearly described scientific issues in a range of contexts. They can select facts and knowledge to explain phenomena and apply simple models or inquiry strategies. Students at this level can interpret and use scientific concepts from different disciplines and can apply them directly. They can develop short statements using facts and make decisions based on scientific knowledge.</td>
</tr>
<tr>
<td>2</td>
<td>409.5</td>
<td>80.8% of students across the OECD can perform tasks at least at Level 2 on the science scale</td>
<td>At Level 2, students have adequate scientific knowledge to provide possible explanations in familiar contexts or draw conclusions based on simple investigations. They are capable of direct reasoning and making literal interpretations of the results of scientific inquiry or technological problem solving.</td>
</tr>
<tr>
<td>1</td>
<td>334.9</td>
<td>94.8% of students across the OECD can perform tasks at least at Level 1 on the science scale</td>
<td>At Level 1, students have such a limited scientific knowledge that it can only be applied to a few, familiar situations. They can present scientific explanations that are obvious and that follow explicitly from given evidence.</td>
</tr>
</tbody>
</table>

(OECD, 2007, p. 43).
One proficiency level represented 74.7 score points (OECD, 2007). The highest level of proficiency, Level 6, was attained on average by 1.3% of 15 year-olds in OECD countries. Finland and New Zealand shared the top percentage, at 3.9%. At the two highest proficiency levels the Finnish and Australian profiles had 20.9% and 14.6% of students respectively, placing the two countries amongst the more scientifically talented countries in the world (OECD, 2007). Although longitudinal trends were not available for this literacy area distribution of students by proficiency levels can be viewed in Figure 3.3.

Figure 3.3. Distribution of students at each proficiency level on the science scale

Countries are ranked in descending order of percentage of 15-year-olds at Levels 2, 3, 4, 5 and 6.
Source: OECD PISA 2006 database, Table 2.1a.
StatLink   http://dx.doi.org/10.1787/1453844475933

(OECD 2007, p. 49).
The 2006 round of PISA data collection grouped Finnish and Australian students together amongst those belonging to the top five scoring nations in scientific literacy. Overall, in scientific literacy Finnish students had an average score of 563 points and Australian students had an average 527 points (OECD, 2007). The two countries had different strengths and weaknesses, yet both achieved pleasing results with less variation than the other two literacy areas. Nonetheless, mention must also be made that Finnish students clearly scored higher than all other countries and continued to set the benchmark for academic success. Due to variance of strengths and weaknesses amongst content and competencies it was not possible to rank all countries exactly. However, the average performance amongst Finnish students was so far ahead that they once again stood out as leaders in scientific literacy (OECD, 2007).

Australian students demonstrated a noticeable weakness in explaining phenomena scientifically, but were strong in identifying scientific issues and using scientific evidence. The strengths of the Finnish cohort were using scientific evidence and explaining phenomena scientifically but weakness was experienced in identifying scientific issues (OECD, 2007). Australian students had a slightly higher relative score for knowledge about science and the Finnish students had a slightly higher relative score for knowledge of science. Nevertheless, these differences in both countries were minor, particularly so amongst the Finnish students (OECD, 2007). Finnish students also stood out in the using scientific evidence scale, with 25% in the top two proficiency levels, whereas the OECD average at these levels was only 11.8% (the Australian average was 17.2%). In addition to having high percentages of top performers the Finnish cohort also had record low percentages of low performers. Only 4.1% of Finnish 15 year-olds scored below proficiency level two whereas the OECD average was 19.2% (OECD, 2007). Finnish authorities
attributed their success in part to the Luma programme that was implemented progressively between 1996 and 2002 to foster scientific excellence (OECD, 2007).

3.4 Differences found by PISA regarding socio-cultural environments in Australia and Finland

As discussed in the literature review, students do not exist in isolation, but are very much influenced by schools, teachers, parents, societies and cultures. Using the Brickman and Miller (2001) model as a framework for reviewing literature these external influences were referred to as socio-cultural contexts and this project specifically focussed on the influences of the home and school environments in Australia and Finland. Supplementary to the literature review, this section will discuss the findings of PISA in relation to socio-cultural contexts in Australia and Finland. Lokan et al. (2001) believed that in order to assess the cumulative yield of education systems, information about students’ home backgrounds and experiences should accompany measures of knowledge and skill. Together with academic testing PISA simultaneously collects data about students’ home backgrounds and personal opinions in an attempt to explain academic variance (OECD, 2001, 2004, 2007). Therefore, this section will discuss socio-cultural influences in two main sections, home and school.

3.4.1 Influences from home environments

As discussed in Chapter 2, home background is inextricably linked to student performance, especially in socio-economic status (SES) (Artelt et.al, 2003; Bourdieu &
Differences between Australian and Finnish student dispositions

Nice, 1984; Datcher, 1982; Fay, 2001; Finn and Rock, 1997; Hart & Risely, 1995; Ho & Willms, 1996; Johnson et al., 2001; Voelkl, 1995). Comparison of socio-economic factors and their influence upon student performance in Finland and Australia has been curious, as socio-economic factors tend to have had significant influence in Australia, but considerably less influence in Finland as shown in Table 3.6.

Table 3.6.

<table>
<thead>
<tr>
<th>Explained variance in student performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian students</td>
</tr>
<tr>
<td>Finnish students</td>
</tr>
<tr>
<td>OECD Average</td>
</tr>
</tbody>
</table>

(OECD, 2007b).

Lie et al. (2003) in their report on Nordic reading performances in the first round of PISA expressed that, in general, the effects of cultural, social and economic capitals on reading literacy are less in Finland than in other Nordic countries and in some instances less than the OECD average. This phenomenon was proven again in the second round of PISA testing in 2003 when Finland was amongst a minority of countries in which socio-economic factors of individual students accounted for five per cent or less of variance in performance (OECD, 2004). Australian and Finnish results contrasted sharply in this regard. The ACER report from the first round of PISA found that the Australian system needed to better compensate for socio-economic disadvantage as socio-economic factors had considerable
influence upon performance in Australia (Lokan et al., 2001). From the second PISA survey (OECD, 2004) it appeared that more Finnish students came from homes that were resourced with items related to classic culture than was the case in Australia. Nevertheless, Väljärvi et al. (2002) have previously reported that Finnish students whose parents belonged to the lowest socio-economic quartile also performed above the OECD average. From this evidence, it would seem that Finnish schooling is more successfully managing the potential effects of socio-economic factors by striving for equitable education.

3.4.2 Influences from school environments

Coupled with the influence of the home upon a student’s disposition towards learning are the influences of school. This section outlines the PISA findings concerning school influences upon Australian and Finnish student performance, particularly SES effects. The ACER report (Lokan et al., 2001) explained that the OECD considers successful education systems to be those that produce high achievers regardless of their socio-economic advantage, with Finland and Korea being the most successful in this regard. Nonetheless, it would appear that the social and economic climates of Finland and Australia are relatively similar; therefore differences in wealth do not explain differences in student performances (OECD, 2004). Moreover, while the Australian government spent marginally more than the Finnish government in cumulative expenditure on educational institutions per student between the ages of six and 15 (OECD, 2004), Finnish students continued to outperform their Australian counterparts.

The OECD’s 2004 report highlighted the relationship between socio-economic factors and their impact upon school climate in terms of discipline, positive perceptions of learning,
school values, parental expectations and teacher commitment. In general, they found that a more advantaged socio-economic intake resulted in a more positive school climate. They also found the opposite to be true; a less advantaged socio-economic intake was more likely to result in a negative climate (OECD, 2004). According to the OECD (2007) social, economic and cultural factors at a school level in Australia were of greater effect than at an individual level. In Finland the effect of social, economic and cultural factors at a school level were measurable, but at an individual level were insignificant (OECD, 2007). Figure 3.4 below shows the most recent OECD (2007) findings about the relationships between school performance and school socio-economic background in Australia and Finland.

*Figure 3.4. Relationship between school performance and school socio-economic background in Finland and Australia*
The very first round of PISA showed that the most significant factors contributing to variance between schools in all three literacy domains were SES and wealth (Lokan et al., 2001). Subsequent studies confirmed this supposition with the most recent PISA findings showing that GDP per capita can be used to predict 28% of variation between countries’ mean scores (OECD, 2007). This same report also grouped Finland and Australia together with a minority of countries where real results were higher than expectations based on spending per student. So although spending on education is vital for attaining the highest levels of education, it is not adequate in itself.

It would seem that the Finnish comprehensive schooling system has been quite successful in providing students with equitable access to learning resources, regardless of personal backgrounds. For example, variance of student performance on the mathematics scale due to SES differences between schools in Finland was significantly small (approximately 1%) on an international scale (OECD, 2004). In comparison the between school variance (approximately 15%) due to SES in Australia was significantly higher, but less than the OECD average (33.6%). Moreover, the combined influence of socio-economic background and school climate on mathematics performance in Australia was much higher than the OECD average, whereas the Finnish measure was the smallest of all OECD countries (OECD, 2004). Notwithstanding these mathematics examples, in science Australia and Finland both ranked amongst the countries that showed above-average performance and below-average impact of socio-economic background upon performance (OECD, 2007).
3.4.2.1 The typical school day

In this section about influences of school environments upon performance and dispositions, a brief discussion about material differences between the two schooling systems sheds light on practical factors that may influence student dispositions. From the most recent PISA study (OECD, 2007) the Finnish students did not report long lesson times and comparatively they spent less time in class than Australian students. The 2007 OECD report suggested that schools with longer learning hours tended to attract more socio-economically advantaged students and that there was a measurable relationship between longer hours and higher intake which was reflected in higher performance. Due to the privatisation of education in Australia this implication may be observable here. However, due to the push for educational equity in Finland the relationship between socio-economic advantage and longer learning times was not measurable at a school level. Further research would need to occur in order to clarify this relationship at an individual level.

Also, worthy of mention are the support services that are regularly included in the Finnish comprehensive school system: free warm meals; school health services to all students; social, psychological and pedagogical support for special needs students; and arranged transportation for distances of five kilometres and over (Välijärvi et al., 2002). Australian schools also offer substantial support to students including health and social services and support for remote students. Some schools provide meals, but this would mostly operate under a user-pays system or on a charitable basis. In most schools there is a canteen where students can purchase food and in some schools community groups have taken the initiative to donate and serve breakfast to students whom otherwise would receive none.
3.5 Known differences in student dispositions

Using the Brickman and Miller (2001) model the literature review found strong relationships between the facets that make up student dispositions (personal values and perceived task value and importance, knowledge of possibilities and perception of obstacles, learning strategies (with a particular focus upon reading), self-concept and self-efficacy, and motivation and movement towards personal future goals) and student performance. This is confirmed by PISA’s findings about student attitudes and approaches to learning and their relationships with performance (OECD, 2001, 2004, 2007). Moreover, Brickman and Miller’s (2001) model was limited in that it fell short of identifying indicators for measuring student dispositions so a new model was proposed in the literature review. The proposed indicators of student dispositions include: parental education levels; frequency of student-parent dialogue; student ratings of the importance of doing well; student ratings of interest and enjoyment; and student ratings of effort.

As discussed in the literature review the first two indicators measure the influence of home backgrounds and the last three are direct indicators of students’ personal dispositions. The PISA reports made comment about the effects of these indicators upon performance in all participating countries; however, due to the magnitude of PISA detailed comparisons specific to countries like Australia and Finland have not been published. Therefore, the research question remains—are there differences between Australian and Finnish school students’ dispositions towards learning, and if so, are there links between differences in dispositions and known differences in performance? This section outlines what PISA has already established about some of the indicators of student dispositions and areas in need of further research for the research question to be satisfied. The indicators below are discussed
in the context of the three literacy areas as these measurements in the PISA study were literacy area specific. (Of note, research findings in Chapters 5 and 6 are also literacy area specific).

3.5.1 Differences in interest and enjoyment

3.5.1.1 Reading—focus on PISA 2000

With regards to measuring student attitudes towards reading in PISA 2000, Australian students were at, but not above, the OECD average. The 2001 ACER report raised concern over the low level of Australian students who read for interest considering the strong correlation between interest in reading and reading literacy (Lokan et al., 2001). In the first PISA study Australian students had the highest difference in reading achievement between the students who never read for enjoyment and those who read for more than an hour each day, more so than any other participating country (Lokan et al., 2001).

The number of books in students’ homes was shown to be a very useful predictor of student achievement. Although a wide range of print materials was available in the majority of Australian homes, most students indicated a preference for reading emails, Web pages, newspapers and magazines in that order. Similarly Finnish students reportedly read non-book materials like newspapers, magazines, comics, emails and Web pages more frequently than the OECD average (Välijärvi et al., 2002). On the other hand reading fiction or non-fiction did not score so favourably, with scores at or below the OECD averages.
This project further examines the PISA data to look at interest and enjoyment in reading (including reading about science and mathematics) as an indicator of values, motivation, self-concept, self-efficacy, and learning strategies (Fay, 2001; Porter, 2007; Rutter, 1983). Further, country-specific relationships between dispositions and reading performance were also investigated. Findings are presented in Chapters 5 and 6.

3.5.1.2 Mathematics–focus on PISA 2003

In all the PISA studies, most students were much more favourable towards reading than mathematics (OECD, 2001, 2004, 2007). In the 2003 study where mathematics was the prime focus about 53% of the students reported being interested in the things they learnt in mathematics but only 38% of students indicated they participated in mathematics for enjoyment (OECD, 2004). It would seem that most students agreed on the worth of the subject mathematics; nonetheless the number of students who expressed negative feelings toward the subject was significant. The OECD (2004) report stressed that this should be concerning for policy makers.

The 2003 PISA results showed that although Finnish students scored highly in mathematics they were not overly enthusiastic about mathematics lessons. Less than half as many students who reported an interest in the things they learn in mathematics indicated that they looked forward to the classes (OECD, 2004). By comparison, Australian students indicated more interest in mathematics, as shown in Table 3.7.
Table 3.7.

*Interest and enjoyment in mathematics amongst Australian and Finnish students*

<table>
<thead>
<tr>
<th>Percentage of students agreeing or strongly agreeing with the following statements:</th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoy reading about mathematics</td>
<td>28%</td>
<td>18%</td>
</tr>
<tr>
<td>I enjoy mathematics lessons</td>
<td>37%</td>
<td>20%</td>
</tr>
<tr>
<td>I do mathematics because I enjoy it.</td>
<td>36%</td>
<td>25%</td>
</tr>
<tr>
<td>I am interested in the things I learn in mathematics</td>
<td>51%</td>
<td>45%</td>
</tr>
</tbody>
</table>

(OECD, 2004).

The analysis of data findings in Chapter 6 shed more light on Table 3.7 showing the varying degrees of interest and enjoyment in mathematics indicated by students in both countries. Further, the data analysis phase of this project also makes inquiry into the relationships between student dispositions and their performance levels.

3.5.1.3 *Science–focus on PISA 2006*

Unlike the mathematics testing which showed lower levels of interest, PISA 2006 revealed a record OECD average of 63% of students indicating an interest in science and learning about science (OECD, 2007). This is very encouraging for educators as the OECD (2007) explained that strong engagement with a subject has a positive relationship with student understanding of the subject. In 52 of the 57 participating countries students who
indicated high levels of *interest* in science also had higher scores in science. Finland was amongst the countries with the strongest associations between interest and performance, along with France, Japan, Korea, and Switzerland. Similarly, *enjoyment* of science showed a positive relationship with student performance in 48% of participating countries (OECD, 2007). Australian students ranked amongst those belonging to countries with the highest correlation between enjoyment and performance, along with the United Kingdom and New Zealand. Most students (68%) indicated that the most interesting scientific topic was human biology. This was followed by interest averages of 46 to 53% for astronomy, chemistry, physics, plant biology, and experiment design. Geology received less favour, with only 41% of students indicating interest, but scientific explanations scored the lowest interest at only 36%. When making comparisons between Australian and Finnish students the OECD (2007) released the figures below, adapted in Table 3.8.
Table 3.8.

Percentages of Australian and Finnish students reporting high or medium general interest in science

<table>
<thead>
<tr>
<th>Subject</th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human biology</td>
<td>62%</td>
<td>66%</td>
</tr>
<tr>
<td>Astronomy</td>
<td>46%</td>
<td>48%</td>
</tr>
<tr>
<td>Chemistry</td>
<td>48%</td>
<td>45%</td>
</tr>
<tr>
<td>Physics</td>
<td>44%</td>
<td>41%</td>
</tr>
<tr>
<td>Plant biology</td>
<td>40%</td>
<td>33%</td>
</tr>
<tr>
<td>Experiment design</td>
<td>36%</td>
<td>24%</td>
</tr>
<tr>
<td>Geology</td>
<td>22%</td>
<td>31%</td>
</tr>
<tr>
<td>Scientific explanation</td>
<td>29%</td>
<td>26%</td>
</tr>
</tbody>
</table>

(OECD, 2007).

Table 3.8 shows that in general Finnish and Australian students were interested in similar topics. This project explored in greater detail the differences of interest in science between the two countries, and their correlations with performance. Findings are presented in Chapter 6.

3.5.2 Differences in academic self-related beliefs

From the outset, it must be established that when reporting on student opinions, attitudes and approaches to learning the OECD (2001, 2004, 2007) provided clear warning about the subjective nature of PISA data. Consequently, the possibility of differences
between student perceptions across countries was likely. For example, two students who both believe they work hard may have differing cultural perceptions of work ethic and effort. This observation presents an opportunity for further research in itself and is an important consideration in this project. Moreover, Artelt et.al (2003) explained the difficulty of changing underlying self-beliefs even when students from disadvantaged backgrounds may have access to enabling school systems. This explanation confirmed the relationship between self-beliefs, home background and performance, as discussed in Chapter 2. For example, in the 2006 PISA study students with at least one parent in a science-related career performed better in the science assessment, in all countries except Japan (OECD, 2007).

With reference to the most recent PISA findings, the OECD (2007) did not find strong consistent associations between self-concept and high performance in science. Notwithstanding this general observation, the OECD’s (2007) report indicated that on average 65% of students reported confidence in providing good answers in science tests, but only between 41 and 45% of students reported confidence in learning science, explaining they did not learn quickly or understand new concepts well. At the other end of the spectrum of confidence on average 47% of students agreed that school scientific topics were easy and that advanced science would also be easy.

Unlike self-concept, self-efficacy in science did show up as having a strong association with student performance (OECD, 2007). Similarly, of the self-related belief factors surveyed by PISA in 2003, self-efficacy also had the strongest association with mathematical literacy amongst Australian students (Thomson et al., 2004). Finnish students were similar to Australian students in explained variance in mathematical results attributed
Differences between Australian and Finnish student dispositions

Anxiety in mathematics has a strong negative relationship with student performance. Of concern is that even when other factors of interest, enjoyment, and self-efficacy were accounted for, mathematical anxiety still presented a strong negative relationship with performance. According to the OECD’s 2004 report Australian students reported more anxiety toward mathematics as a subject than Finnish students. Moreover, Thomson et al. (2004) argued that anxiety was directly related to poorer performance and decreased effort in Australia. Finnish students were amongst those from countries indicating the least amount of anxiety, with only 7% of students reporting nervousness about mathematics homework. Sahlberg (2007) believed this to be a result of the flexible and creative Finnish approach to schooling where learning is not assessment driven.

3.6 Conclusion

This chapter has provided an overview of the nature and history of PISA, the performances of Australian and Finnish students in PISA tests, and the contributing factors to performance differences—namely influences of home and school environments and student dispositions. When examining the reasons attributed to performance differences, the PISA findings complement the findings of the literature review: in short, performance improves with higher SES and positive dispositions. When comparing environmental influences upon performance amongst Australian and Finnish students it has been found that SES factors in both home and school environments in Australia were much more influential than in
Finland. In this light, the push for quality and equity in Finnish education has notable advantages when it comes to mean performances in PISA.

This chapter also found that student dispositions are directly related to performance, as discussed in the literature review. Importantly, PISA warned against international comparison of student attitudes using direct figures as they are likely to be culturally embedded and interpretation may differ between countries (OECD, 2001, 2004, 2007). Nevertheless, when viewing general country profiles of student dispositions this chapter pointed to differences between the two countries. But without further analysis of PISA data there was not sufficient information from PISA literature about differences between student dispositions to draw satisfactory conclusions about Australian and Finnish students. To this end a ‘gap’ has been identified in current literature, including the PISA reports, as comparisons of the specific differences between the two countries regarding student dispositions and their links to performance are scarce and therefore inconclusive. This presents a timely opportunity for further analysis of the PISA data to solve the research problem by discovering whether there are differences between Australian and Finnish students’ dispositions towards learning and if so whether there are links between different dispositions and known differences in academic performance. Accordingly, Chapter 4 that follows outlines the research methodology that has been adopted and the methods that are employed and Chapters 5 and 6 presents the research findings.
4.0 METHODS

4.1 Introduction

Up to this point discussion has centred on what is and what is not known about the research problem and the research question: Are there differences between Australian and Finnish school students’ dispositions towards learning, and if so, are there links between differences in dispositions and known differences in performance? The literature review discussed what is known about student dispositions and the supplementary chapter about PISA outlined the known differences between Australian and Finnish students. This chapter is concerned with the research methods employed to answer the research question. Research pertaining to population generalisations is best conducted quantitatively (Walter, 2006). Therefore, this project will conduct a thorough investigation of the existing Programme for International Student Assessment (PISA) student data to establish trends and drawn comparisons between Finnish and Australian students’ dispositions using quantitative methods of analysis. As outlined in the sections below, the research methods involve careful selection of questions from the PISA evaluation instruments, particularly the student questionnaires, outlined in Table 4.1. Information yielded from the selected student questionnaire items is also analysed by academic performance data to assess the effects of student dispositions upon performance.

After critiquing current literature Chapter 2 concluded by proposing a model (Figure 2.5) that illustrated the links between the facets of student dispositions and their operational
Differences between Australian and Finnish student dispositions indicators. These indicators included student ratings of the *importance of doing well*, *interest*, *enjoyment* and *effort* in schoolwork. Acknowledging the indisputable influence of the home environment they also include *student-parent dialogue* and *parental education*. Subsequently, the questionnaire items that are displayed in Table 4.1 were chosen according to this model and all other questionnaire items forsaken due to the constraints of this project.

This project adopts Crotty’s (1998) scaffold of research where methods stem from methodology, and methodology stems from theoretical perspective. In this case, statistical analysis methods stem from a survey research methodology, which stems from a positivist theoretical perspective. These research components form the main sections of this chapter. Because this research relies upon survey research conducted by PISA, survey design and data collection do not form part of this project. The OECD (2004, 2007) claims that PISA instruments have high degrees of validity and reliability as treatment of student responses from the sample groups was particularly careful to ensure stringent quality assurance mechanisms in the data collection. For example, reliability studies were employed to ensure standards of marking (OECD, 2004). Using Crotty’s (1998) scaffold, the research methods including data selection are discussed in more detail below in Section 4.2, the methodology of survey research is discussed in the context of PISA in Section 4.3, and finally the positivist theoretical perspective, in which methods and methodology are nested, is discussed in Section 4.4.
Table 4.1.

Operational indicators drawn from PISA student questionnaires

<table>
<thead>
<tr>
<th>Operational indicators of student dispositions</th>
<th>Relevant PISA 2000 Student Questionnaire (SQ) and Cross-Curriculum Competencies (CCC) items (focus on reading literacy)</th>
<th>Relevant PISA 2003 Student Questionnaire items (focus on mathematical literacy)</th>
<th>Relevant Student Questionnaire for PISA 2006 items (focus on scientific literacy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The importance of doing well</td>
<td>Q. 36abc Rating the importance of doing well in language, mathematics and science subjects</td>
<td>Q. 16b Rating of interest in reading about science</td>
<td></td>
</tr>
<tr>
<td>Interest and enjoyment</td>
<td>SQ q. 35b Rating reading as a favourite hobby</td>
<td>Q. 2 (49) Rating of the personal importance of mathematics</td>
<td>Q. 16d Rating enjoyment of science</td>
</tr>
<tr>
<td></td>
<td>SQ q. 35c Rating how much students like to talk about books to others</td>
<td>Q. 30a Rating of enjoyment in reading about mathematics</td>
<td>Q. 16e Rating of general interest in science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Q. 30d Rating enjoyment in subject mathematics</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Q. 30f Rating of interest in mathematics</td>
<td>Q. 18f Rating of whether science is valuable to society</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Q. 18g Rating of whether science is personally relevant</td>
<td></td>
</tr>
<tr>
<td>Operational indicators of student dispositions</td>
<td>Relevant PISA 2000 Student Questionnaire (SQ) and Cross-Curriculum Competencies (CCC)</td>
<td>Relevant PISA 2003 Student Questionnaire (focus on mathematical literacy)</td>
<td>Relevant Student Questionnaire for PISA 2006 items (focus on scientific literacy)</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Effort</td>
<td>CCC q. 1 (7) Rating of doing hard work</td>
<td>Q. 30b Rating whether or not making an effort in mathematics is worth it</td>
<td>Q. 35a Rating whether making an effort in science is worth it for future work</td>
</tr>
<tr>
<td></td>
<td>CCC q. 1 (20) Rating of effort to acquire knowledge and skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student-parent dialogue</td>
<td>SQ q. 19f Frequency of students just talking with their parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ q. 19d Frequency of students discussing schoolwork problems with parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ q. 19b Frequency of students discussing books, films and television with parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ q. 19a Frequency of students discussing politics with parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational indicators of student dispositions</td>
<td>Relevant PISA 2000 Student Questionnaire (SQ) and Cross-Curriculum Competencies (CCC) Questionnaire items (focus on reading literacy)</td>
<td>Relevant PISA 2003 Student Questionnaire items (focus on mathematical literacy)</td>
<td>Relevant Student Questionnaire for PISA 2006 items (focus on scientific literacy)</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Parental education levels</td>
<td>SQ q. 12  Mother’s level of schooling</td>
<td>Q. 11  Mother’s level of schooling</td>
<td>Q. 6  Mother’s level of schooling</td>
</tr>
<tr>
<td></td>
<td>SQ q. 13  Father’s level of schooling</td>
<td>Q. 12  Mother’s level of tertiary education</td>
<td>Q. 7  Mother’s level of tertiary education</td>
</tr>
<tr>
<td></td>
<td>SQ q. 14  Mother tertiary educated (yes or no)</td>
<td>Q. 13  Father’s level of schooling</td>
<td>Q. 9  Father’s level of schooling</td>
</tr>
<tr>
<td></td>
<td>SQ q. 15  Father tertiary educated (yes or no)</td>
<td>Q. 14  Father’s level of tertiary education</td>
<td>Q. 10  Father’s level of tertiary education</td>
</tr>
</tbody>
</table>
4.2 Research methods: Quantitative analysis of selected data

To answer the research question, the principal methods employed revolve around the selection and analysis of data collected by the OECD in their 2000, 2003 and 2006 PISA studies. The PISA data pertinent to student dispositions, as itemised in Table 4.1, were selected to scrutinise the differences between Australian and Finnish students and ultimately assist in filling this gap in current knowledge. As alluded to in this chapter’s introduction, PISA items were chosen according to the model that was developed from the review of literature (Figure 2.5, p. 71). In analysis of the differences between the two countries the independent variable was “student dispositions”, which was operationalised by the measurable indicators. These indicators were organised into two meta-categories. The first category was the influence of the home upon student dispositions and included “parental education” and “frequency of student-parent dialogue”. The second category was students’ personal dispositions and included “student ratings of the importance of doing well”, “student ratings of interest and enjoyment”, and “student ratings of effort”. These five dispositions are explained in Section 2.5 of the literature review (p. 64-68). The relationships between these indicators and the facets that make up student dispositions are also critiqued in Chapter 2. Furthermore, the dependent variable, or the construct that was an outcome of the independent variable, was student performance. In quantitative terms, the research question focused on determining whether or not there are differences between Australian and Finnish school students’ dispositions towards learning (independent variable); and if such differences do exist, then it was to determine whether or not the links between the differences in dispositions (independent variable) relate to known differences in performance (dependent variable).
4.2.1 Selection of data

Specific questions from the PISA student questionnaires, outlined in Table 4.1, were chosen for additional data analysis in order to find answers to the research question. Walter (2006) explained that when patterns of relationships between responses to questions are examined properly, even though the process may be tedious, there can be a profitable return of new insights. The questions selected for analysis were those that employed language synonymous with the aforementioned indicators of student dispositions identified in the review of literature and were therefore judged to potentially hold further posited information about student dispositions and performance.

4.2.1.1 Selection of PISA 2000 items

PISA 2000 used a rotating system of nine test booklets. Each student was randomly assigned an assessment booklet, but not all booklets contained the same assessment items. One booklet contained only questions about reading. Three booklets contained only reading and mathematics questions, another three booklets contained only reading and scientific questions, and two booklets contained questions pertaining to all three literacy areas (OECD, n.d.). In addition, the PISA 2000 Student Questionnaire was designed to collect information from all students pertaining to their families, home environments, reading and study habits, and school and daily activities. Students were allocated 20 to 30 minutes to complete the Student Questionnaire comprising 41 questions (OECD, n.d.). The PISA 2000 Cross-Curriculum Competencies Questionnaire (CCCQ) was also designed to collect information from all students, and comprised 52 multiple-choice questions.
The *PISA 2000 Technical Report* (Adams & Wu, 2002) explained that the questions chosen from PISA 2000, outlined in Table 4.1, contribute to the following indices:

- **Social Communication Index**
  - Questions 19d and 19f
- **Cultural Communication Index**
  - Questions 19a and 19b
- **Family Education Support Index**
  - Questions 20a, 20b and 20c
- **Effort and Perseverance Index**
  - Questions 1 (7) and 1 (20) (CCCQ)
- **Interest in Mathematics Index**
  - Questions 2 (49) (CCCQ)
- **Engagement in Reading Index**
  - Questions 35b and 35c

As previously mentioned in the literature review in Section 2.4.1, the above indices were very similar in nature to what Lie et al. (2003) described as cultural capital. Further, Bourdieu (1977) explained that language is a key aspect of cultural capital, as the complexity of its system will determine the effectiveness of communication and the transfer of knowledge and skills.

### 4.2.1.2 Selection of PISA 2003 items

Each student who participated in the 2003 round of PISA sat 120 minutes of academic testing. Students did not participate in every assessment item, but rather a selection of assessment item clusters. The sum of the assessment items was divided into seven 30-minute mathematics clusters and three 30-minute clusters each for reading, science and problem solving, which were arranged into 13 different test booklets. As mathematics was the focus of PISA 2003 every student answered mathematics items. But reading, science and problem solving items were only each answered by half of the participants as the results from these literacy areas were considered mere profile summaries in comparison (OECD,
Consequently, compared to 2000 and 2006 much information was available about mathematics in this round.

The PISA 2003 Student Questionnaire was administered after the academic testing, and took approximately 35 minutes for students to complete (OECD, 2005b). The questionnaire comprised 38 questions, gathering data about the student and his/her family, the student’s education, information about the school he or she attended, their learning of mathematics, and specific information about mathematics classes (OECD, 2003). Items selected from PISA 2003 are outlined in Table 4.1. Importantly, although the questionnaire items from the different data collection periods are not identical, collectively they contribute to a greater landscape of knowledge about student dispositions. This study sought after holistic patterns from the available data.

4.2.1.3 Selection of PISA 2006 items

To conduct international comparative testing in the 2006 round of PISA, assessment items were organised into 13 test booklets, equating to a total assessment time of 390 minutes. Each student was randomly assigned one test booklet, which comprised a combination of test items equating to 120 minutes. Of the 390 minutes allocated to all test items 210 minutes (54%) were allocated to science, 120 minutes (31%) to mathematics, and 60 minutes (15%) to reading (OECD, 2007). Accompanying the academic assessment was the Student Questionnaire for PISA 2006 comprising 37 questions. Data was gathered from this questionnaire pertaining to: the student and their family, their views on scientific issues and the environment, science related careers, learning time and teaching and learning practices in science (OECD, 2006). Selected items are outlined in Table 4.1.
To answer the research question descriptive statistics from the above PISA questionnaire items were analysed using both descriptive and inferential statistics methods as explained below.

4.2.2 Scientific background to statistical analysis

SPSS Graduate Pack 16.0 software was used to statistically analyse the PISA data and compare results pertaining to Australian and Finnish students. It also tested for significance using chi-square and ANOVA tests. The first step in the analysis process was to find out what information the PISA data held concerning the independent variable (dispositions towards learning amongst Australian and Finnish students). For the purpose of comparative statistical analysis the null hypothesis for this project was that there is no difference in dispositions towards learning between Australian and Finnish school students.

Student dispositions were measured by the students’ responses to the aforementioned selected questions from the PISA student questionnaires and tested by cross tabulation using the Pearson chi-square test to compare Australian and Finnish data. The Pearson chi-square measures frequency of scores and differences between observed and expected values and tests whether differences exists within or between groups (Kervin, Vialle, Herrington & Okely, 2006). Significant differences occurred in the frequency and distribution of dispositions between Australian and Finnish students. For example, using chi-square testing percentages of students were allocated to the frequency categories of student-parent

The chi-square equation is

\[ \chi^2 = \sum \frac{(O - E)^2}{E} \]

\( O \) = the frequencies observed  
\( E \) = the frequencies expected  
\( \Sigma \) = the ‘sum of’

(Burns, 2000).
discussion (an indicator of student dispositions) “several times a week,” “several times a month,” “once a month,” “few times a year,” or “never”. Chi-square tests the significance of these frequency percentages to ascertain whether differences existed between Australian and Finnish students’ dispositions. The test was repeatedly used for each selected questionnaire item to determine whether differences exist between Australian and Finnish students concerning the variable (dispositions toward learning).

In calculating chi-square, Garson (2008) outlined the following assumptions:

1. Random sample data. As a large sample of population data was randomly selected from both countries the assumption is held that any differences are real and consequently significant.

2. Independence. An observation is to only appear once in one cell and must be independent of other observations.

3. Non-directional hypotheses. Should a significant relationship between two variables be found, this does not prove a cause-and-effect relationship. Chi-square tests the hypothesis that two variables are related only by chance.

4. Normal distribution of deviations. The chi-square test is nonparametric in nature.

5. Null hypothesis is assumed until rejected. The null hypothesis is that the numbers of observations in each category are equal and the alternate hypothesis is that the observed numbers are different to the expected.
The chi-square distribution can be graphed once the test statistic is known and probability is calculated. The shape of the chi-square is dependent upon the number of degrees of freedom (the number of the values of the variable minus one). For example, if there were five possible responses to a question, the number of degrees of freedom would be four. Commonly, social scientists interpret a chi-square probability of .05 or less as justification for rejecting the null hypothesis that the row variable is only randomly related (or unrelated) to the column variable (Garson, 2008). Therefore, the smaller the chi-square probability the higher the confidence interval to reject the null hypothesis for any given statistical outcome. For this project this meant that the differences found between the two countries were significant and the null hypothesis that there are no differences was rejected. Most SPSS chi-square test outcomes in this project yielded significance results of .000. Therefore, the chi-square computations will be shown in the first section of data analysis in Chapter 5 and only shown thereafter if the significance results differ from .000.

The second step of scientific analysis in this project was to determine the relationships between the independent variable (student dispositions) and the dependent variable (student performance). Bi-variate analysis methods were used to calculate mean student performance parameters for each category of the independent variable. For example, for the student-parent discussion indicator, mean student performances for each country were calculated for each category of frequency of discussion. To do this the analysis of variance test (ANOVA) was used to test for significance of difference. When comparing the mean performance parameters between Australian and Finnish students the researcher wanted to know if any observed differences between the two samples (Australian and Finnish students) were significant and whether they were reflective of the populations. ANOVA was repeatedly used for each indicator to disprove the null hypothesis that there are no
differences between the two countries. ANOVA attempts to uncover the effects of categorical independent variables on an interval dependent variable.

ANOVA’s key statistic, the F-test of difference of group means, was used to test whether the means of the groups formed by the independent variable were different enough not to have occurred by chance, testing the null hypothesis that differences between groups do not exist. Between-group variance is the measured variance of the group means from the overall mean of all observations, whereas within-group variance is weighed for group size and is a function of the variances of observations in each group (Garson, 2008). Social researchers adhere to the following computation guidelines: If the F-test result is >1, then more variance occurs between groups than within groups. Therefore, the grouping variable does not make a difference. F-test computations above 1 are found to be significant in the table of F values. Where F is significantly greater than 1, the larger the ratio or between-group variance to within-group variance, the less likely that the null hypothesis is true. Where the F computation is around 1, it can be assumed that differences between group means are only random variations. A "Sig." or "p" probability value of .05 or less on the F-test conventionally leads the researcher to conclude the effect is real and not due to chance of sampling. For most ANOVA designs, F is between-groups mean square variance divided by within-groups mean square variance (Garson, 2008).

For both ANOVA and chi-square calculations, significance is expressed in decimal format. For example, if Sig. = .000, then the probability of the null hypothesis occurring is less than .001 (p < .001), that is 1 time out of 1000. If Sig. = .0000, then the probability of the null hypothesis occurring is less than .0001 (p < .0001), that is 1 time out of 10 000.
It should be noted that due to the sample sizes, the ANOVA significance results in most SPSS computations were .000. Therefore, unless otherwise stated, the null hypothesis that group means are the same is rejected and an alternative hypothesis, that differences exist between the means, is adopted.

To calculate student mean performance scores the OECD’s *Manual for the PISA 2000 Database* and the *PISA 2003 Data Analysis Manual: SPSS® Users* (n.d., 2005) explained that the plausible values in the datasets are to be used to analyse and report statistics at population levels. Plausible values are preferable over weighted likelihood estimates (WLE’s) as the WLE’s may yield biased outcomes as they are more suitable for analysing individual cases (students). Plausible values are random numbers drawn from population distribution, representing the range of abilities that a student might reasonably possess, and are designed to present consistent estimations of population parameters (OECD, n.d., 2005; Adams & Wu, 2002). There were five plausible values allocated to each literacy area. A further five plausible values were also allocated to each subscale in the literacy area of focus each consecutive year. For example, the reading subscales were allocated plausible values in 2000 and the mathematics subscales in 2003. For the purpose of this project the combined plausible values were sufficient, that is: PV1read to PV5read for reading; PV1math to PV5math for mathematics; PV1scie to PV5scie for science. The manuals available for the 2000 and 2003 data (OECD, n.d., 2005) advised that all five plausible values for a literacy area should be used for final estimates – that is, analysis needed to occur five times, once for each plausible value, and the results combined. Once SPSS analyses were conducted on all five plausible values and their standard errors, the data were transferred to Microsoft Excel for further computation. Table 4.2 shows the calculations for plausible values and standard errors.
Table 4.2.

Calculations for plausible values and standard errors in Excel

<table>
<thead>
<tr>
<th>Plausible Value</th>
<th>Parameter Estimate</th>
<th>Standard Error*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>[a1]</td>
<td>[b1]</td>
</tr>
<tr>
<td>2</td>
<td>[a2]</td>
<td>[b2]</td>
</tr>
<tr>
<td>3</td>
<td>[a3]</td>
<td>[b3]</td>
</tr>
<tr>
<td>4</td>
<td>[a4]</td>
<td>[b4]</td>
</tr>
<tr>
<td>5</td>
<td>[a5]</td>
<td>[b5]</td>
</tr>
</tbody>
</table>

Sampling variance \( = (b1^2 + b2^2 + b3^2 + b4^2 + b5^2) / 5 \) [a6]
Mean parameter estimate \( = (a1 + a2 + a3 + a4 + a5) / 5 \) [a7]
Measurement variance \( = ((a1-a7)^2 + (a2-a7)^2 + (a3-a7)^2 + (a4-a7)^2 + (a5-a7)^2) / 4 \) [a8]
Variance of parameter estimate \( = a6 + (1.2 \times a8) \) [a9]
Corrected standard error \( = \sqrt{a9} \)

(OECD, n.d., p. 25).

Once SPSS computations were executed to compare responses to selected student questionnaire items between the countries, and then these responses were compared to student mean performance parameters, SPSS outputs were transferred to Microsoft Excel spreadsheets so that results could be graphed. The results of these analyses are found in Chapters 5 and 6.

4.3 Methodology: Survey research

Following Crotty’s (1998) definitions, the methodology for this project was survey research. Walter (2006) outlined the advantages and disadvantages of survey research. Advantages include versatile and efficient methods for large-scale data; allowance for population studies by using samples; and usefulness for statistical analysis and secondary data analysis. On the other hand, disadvantages are that surveys are merely snapshots in
time; although quantitative in nature, surveys are influenced by people’s attitudes and beliefs, which are not guaranteed to be constant; and the establishment of a relationship does not equal establishing causality. Further, Kervin et al. (2006) explained that questionnaires are dependent upon high levels of reading literacy, which could disadvantage some participants.

When investigating the validity and reliability of surveying the opinions of 15 year olds, Rutter’s (1983) research found that students’ self-reports are preferable over teacher reports as they have been found to be more valid for cross-school comparisons. Further, Schneider (1996) argued that 15-year-old students possess sufficient knowledge about their own learning to offer justifiable answers (as cited in OECD, 2004).

4.3.1 Sampling

As this project uses the existing results from PISA’s original survey research, this section outlines the samples for each round of data collection. OECD results from all PISA studies were based on samples from each country, albeit large cohorts, but samples nonetheless. Therefore, there was an associated degree of uncertainty expressed in their reports through a standard error. Moreover, confidence intervals were used to make inferences about the samples so that unless otherwise stated in the OECD reports, results were based on a 95% chance that the true value lays within the confidence interval (OECD, 2004). Table 4.3 outlines the PISA samples in each data collection period.
Table 4.3.

*PISA samples*

<table>
<thead>
<tr>
<th>Year</th>
<th>OECD</th>
<th>Others</th>
<th>Total</th>
<th>Number</th>
<th>% of population</th>
<th>Total</th>
<th>Number</th>
<th>% of population</th>
<th>Number</th>
<th>% of population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>28</td>
<td>4</td>
<td>32</td>
<td>173,895</td>
<td>1%</td>
<td>15,959,166</td>
<td>5,176</td>
<td>2%</td>
<td>229,152</td>
<td>8%</td>
</tr>
<tr>
<td>2003</td>
<td>30</td>
<td>11</td>
<td>41</td>
<td>&gt; 250,000</td>
<td>~1%</td>
<td>~23,000,000</td>
<td>12,551</td>
<td>4.6%</td>
<td>268,164</td>
<td>9.4%</td>
</tr>
<tr>
<td>2006</td>
<td>30</td>
<td>27</td>
<td>57</td>
<td>&gt; 400,000</td>
<td>~2%</td>
<td>&gt; 20,000,000</td>
<td>14,170</td>
<td>5%</td>
<td>270,115</td>
<td>7%</td>
</tr>
</tbody>
</table>
4.3.1.1 PISA 2000 data

The desired number of participating schools from each country in PISA 2000 was 150, with at least 35 students from each school (Lokan et al., 2001). Students responded to a two-hour assessment booklet and a 30- to 40-minute questionnaire. Principals of participating schools also completed a 30-minute questionnaire; however, this data was not used in this study.

The priority of PISA 2000 was to collect reading literacy and family background information (Lokan et al., 2001). Therefore, all students (228,784 cases) completed the Student Questionnaire and were assessed in reading. However, not all students were assessed in mathematics and science, only 127,388 and 127,236 cases respectively. The PISA study has accommodated these differences by appropriately weighting data to yield valid results (OECD, 2001). There are three OECD data files that are available from the PISA 2000 Student Questionnaire, which also include the responses from the Cross-Curriculum Competencies Questionnaire:

1. Student and reading performance data file (filename: intstud_read.txt), 400 variables, 228,784 cases. This file contains data pertaining to each student who participated in the assessment, and also includes information about reading performance parameters.

2. Student and mathematics performance data file (filename: instud_math.txt), 417 variables, 127,388 cases. This file contains data pertaining to those students who were assessed with one of the booklets containing mathematics material, and also includes information about reading and mathematics performance parameters.
These academic scores were used to investigate the relationships between dispositions and performance.

3. Student and science performance data file (filename: instud_scie.txt), 407 variables, 127,236 cases. This file contains data pertaining to those students who were assessed with one of the booklets containing science material, and also includes information about reading and science performance parameters that was used to evaluate the relationships between student dispositions and performance.

The 2000 PISA data was published by the OECD in three separate files to eliminate the risk of over-weighting the mathematics and science data as only two-ninths of students were assessed in either of these domains (OECD, n.d.). All data files from PISA 2000 contain adjustment factors for each country so that each country contributes equally to the data. Fay’s replicates (OECD, n.d.) are also included in the data files, so that unbiased standard errors estimates can be made, making provision for population parameters. Nevertheless, the reader should be mindful that mathematics and science scores are only representative of approximately two-ninths of the sample, whereas reading was assessed across the entire sample. Therefore, when it was necessary to analyse the responses from all students (for example, comparing non-literacy-specific Student Questionnaire responses), the student and reading file (instud_read.txt) was sufficient. However, when comparing academic performances between the two countries, all three files were put to use, so as to gain a holistic perspective on academic performance.
4.3.1.2 PISA 2003 data

Launched from the success of the 2000 study, the 2003 assessment increased in sample size and detail of analysis. The focus of the study shifted to mathematical literacy and the added assessment area of problem solving. Not only did the 2003 assessment add breadth to the study, it also added depth as it further delved into curricular competencies and student backgrounds. Comparisons were made regarding change over time as it deemed such comparisons to be statistically valid and reliable (OECD, 2004). The data file made available by the OECD on the Internet for the PISA 2003 Student Questionnaire (INT_stui_2003_v2.zip), included 276,165 cases, each with 404 variables. The data from 2003 was most similar to that collected in 2006.

4.3.1.3 PISA 2006 data

The PISA 2006 study completed the first cycle of the OECD’s assessment programme, taking its turn to focus upon scientific literacy. In 2006 the participating countries together made up approximately 86% of the world’s GDP (OECD, 2007). The OECD (2007) explained that these 15-year-olds were aged between 15 years and three months and 16 years and two months at the time of testing. In each country random samples of at least 4,500 students from at least 150 schools were taken. Some countries, like Australia, had larger samples (14,170 students) for reasons such as using the PISA data for other testing programmes, or in the case of Australia ensuring that reliable estimates could be inferred for indigenous communities and smaller states (Thomson & De Bortoli, 2008). As with previous years, students completed a two-hour pencil and paper assessment booklet and a 30-minute questionnaire to collect information about their personal backgrounds. Principals
from participating schools also completed a 30-minute questionnaire (OECD, 2007). Data from the Student Questionnaire for PISA 2006 was downloaded from the PISA website (file: INT_Stu06_Dec07.zip) and consisted 398,750 cases and 491 variables.

4.4 Theoretical perspective: Positivism

As pre-empted in Chapter 3, this project makes use of the existing PISA data sets to investigate the research problem. Due to the magnitude of the PISA study, quantitative methods were necessary to achieve population generalisations about student dispositions, thus mathematical and scientific analysis was employed. Naturally then, the theoretical perspective that underpins this project was positivism, which has its roots in the epistemology of objectivism (Crotty, 1998). The first articulated objective of this project reads (Section 1.6, p. 28): “in a comparative study, to uncover the dispositions towards learning between Australian and Finnish students and report any differences.” The use of the word “uncover” reflects the positivist nature of this study; a quest to reveal what is posited within the data (Crotty, 1998). Quantitative analysis began with specific concrete items such as the PISA datasets and results in more abstract and general items like comparative population generalisations (Punch, 1998). The Latin word “data” or “datum” can be interpreted “given” meaning that the analysis of data is a study of the given (Crotty, 1998). Positivism has its roots in structural functionalism, a macro-sociological perspective about the relationships between components of society and society as a whole, attempting to explain expansive societal structures (Walker & Loughland, 1998). Such a theoretical foundation is useful to a project that seeks to discover generalisations about the Australian and Finnish populations.
Auguste Comte (1798-1857), one of the fathers of positivist sociology, described it as the bid to scientifically establish constant relationships between various phenomena; such relationships he termed ‘laws’ (Crotty, 1998). Comte specified that such ‘laws’ could be established by the methods of observation, experiment and comparison. The Vienna Circle of the 1920s advocated the philosophy of logical positivism. In a discussion of the history of logical positivism, Crotty (1998) described the role of science to be the establishment of facts and the role of philosophy to bring clarification and further proposition in the wake of science. Moreover, positivism is very closely linked to empirical science and has faith that scientific knowledge is accurate and certain (Crotty, 1998).

Bryman (2008) acknowledged the long-standing debate about using scientific models for social research. He compared positivism and critical realism, explaining that a positivist might attempt to directly conceptualise reality, whereas a realist would view this attempt simply as a way of knowing reality. Criticisms of positivism have often come from its attempt to concrete reality (Cohen, Manion, Morrison, 2007). However, although procedural objectivity is central to positivism, Hammersley (2001) believed all positivist research to rely upon subjectivity as well as its objective operational procedures. He argued that such explicit procedures are often accompanied by decision-making, assessment and intuition. This view of positivism presents a case for positivist research in partnership with the researcher’s judgment, rather than research that relies upon explicit procedures. For example, Hammersley explained that statisticians might make decisions about tests that cannot be governed by rules based on the nature of the data available and the processes that are being studied. This leads to the view that science is a source of potential, posited knowledge, but is open to the judgment and scrutiny of the discoverers.
This project used quantitative methods to unearth posited knowledge in the PISA data sets and judgements were made about the information that was discovered. These findings add to current knowledge about differences between Australian and Finnish student dispositions.

4.5 Conclusion

This chapter has discussed the methods and associated underpinning theory that supports this project. To this point the reader has been introduced to the research problem in Chapter 1, a review of current literature in Chapters 2 and 3 and a discussion of the approach to research in this chapter. Putting these methods, methodology and theoretical perspective into practice resulted in some very interesting findings that are now presented in the following chapter.
5.0 RESULTS: INFLUENCES FROM HOME ENVIRONMENTS UPON STUDENT DISPOSITIONS

5.1 Introduction

This chapter presents the results of the data analysis within the research project. Having outlined the research problem in Chapter 1, explained what is and is not known about the problem in Chapters 2 and 3, and the means for finding out what is not known in Chapter 4, the next two chapters report on the findings from the data analysis. In doing so some of the gaps in current knowledge about differences in dispositions towards learning between Australian and Finnish students are filled. The research question was concerned with ascertaining whether or not there are differences between student dispositions in Australia and Finland, and if there are differences then whether or not these are linked to student performance.

As outlined in the research methodology in Chapter 4, this project made use of the following indicators of student dispositions as established by review of literature in Chapter 2: parental education levels; frequency of student-parent dialogue; student ratings of the importance of doing well; student ratings of interest and enjoyment; and student ratings of effort. The first two indicators measured external influences of the home upon student dispositions and the last three indicators were direct measures of students’ personal dispositions towards learning. To this end, the results of data analysis have been organised into two chapters – influences of home environments upon student dispositions in this
chapter and students’ personal dispositions in Chapter 6. The five indicators have been used as headings in the two results chapters. Under these headings specific literacy areas have been given due acknowledgement in these results as this study has found that student dispositions vary between literacy areas.

Qualification. From the outset, it must be stated that the OECD (2001, 2004, 2007) warned that students’ personal dispositions might not be comparable across countries due to cultural differences. Rather, the OECD cautioned that results should be viewed within the unique context of each country. In heed of this warning, this study separately studied each of the profiles that emerged within the Australian and Finnish student cohorts using the personal disposition indicators. In this document these profiles are referred to as “country profiles” and are specific to either Australian or Finnish students. Using these country profiles, this study made inferences about each country in terms of what the majority of students indicated, forsaking specific nominal data and instead viewing results in terms of overall country generalisations. In due course inferences about majorities and minorities of Australian and Finnish students were later used for cross-country comparison of students’ personal dispositions.

5.2 Measures of home influences upon student dispositions

In the review of literature in Chapter 2 the weight of opinion was that it is nigh impossible to separate a child’s academic success from the influence of his or her parents and their socio-economic status (Artelt et al., 2003; Ho & Willms, 1996). Therefore, the
results of the analysis conducted to measure the influences of the home upon student dispositions are reported below in two sections, parental education levels and frequency of student-parent dialogue.

5.2.1 Indicator 1: Parental education levels

Analysis of parental education levels was conducted with the established understanding that other research shows that academic success is impeded by low socio-economic status (Datcher, 1982; Finn & Rock, 1997; Johnson et al., 2001; Voelkl, 1995) and that parental education is strongly linked to student reading literacy (Lie et al., 2003). Therefore, enquiry into parental education levels was useful for investigating the differences between the dispositions of Australian and Finnish students as influenced by their home backgrounds. Although an absence of education was not necessarily indicative of negative dispositions towards learning—for indeed one whom has been denied education might place high value upon it—pursuit of education beyond compulsory years was considered an indication of positive dispositions towards learning. Therefore, the percentages of parents who completed senior schooling and tertiary study were of interest to this investigation.

Figure 5.1 shows that the highest attainment levels of schooling for Australian parents (year 12) have fluctuated round 70% over the three PISA data collection periods, whereas the comparative percentages amongst Finnish parents have steadily increased from below 70% to around 80%. Simultaneously, the percentage of Finnish parents who only complete lower secondary and primary education has steadily dropped. These same figures have remained somewhat static for Australian parents.
Figure 5.1. Australian and Finnish parents’ highest levels of schooling

Note. Based on SPSS analysis of OECD 2000 Student Questionnaire data retrieved from

Scientific analysis of these inferential statistics, using the Chi-Square test to decide
whether categorical variables differ significantly from expectation was undertaken as
follows:
2000 Results:
Fathers:

Pearson Chi-Square value = 1.311E3
Degrees of freedom = 4
Asymp. significance (2 sided) = .000

\[ x^2(4) = 1.311E3, \ p < 0.001. \]

Mothers:

Pearson Chi-Square value = 9.337E2
Degrees of freedom = 4
Asymp. significance (2 sided) = .000

\[ x^2(4) = 9.337E2, \ p < 0.001. \]

2003 Results:
Fathers:

Pearson Chi-Square value = 1.761E3
Degrees of freedom = 4
Asymp. significance (2 sided) = .000

\[ x^2(4) = 1.761E3, \ p < 0.001. \]
Mothers:

Pearson Chi-Square value = 1.972E3
Degrees of freedom = 4
Asymp. significance (2 sided) = .000

\[ x^2(4) = 1.972E3, \, p < 0.001. \]

2006 Results:

Fathers:

Pearson Chi-Square value = 1.792E3
Degrees of freedom = 4
Asymp. significance (2 sided) = .000

\[ x^2(4) = 1.792E3, \, p < 0.001. \]

Mothers:

Pearson Chi-Square value = 1.875E3
Degrees of freedom = 4
Asymp. significance (2 sided) = .000

\[ x^2(4) = 1.875E3, \, p < 0.001. \]

Considering these results, the null hypotheses that Finnish and Australian results for parents’ schooling are the same can be rejected. Therefore, we can say with confidence that the proportion of Finnish parents with higher schooling is steadily increasing over time,
whereas the comparative percentage of Australian parents dropped and then recovered over the three PISA studies.

Student mean performance parameters were calculated according to the categories of parental schooling and combined from the three PISA years in Figures 5.2 and 5.3 to show the relationship between parental schooling and student performance. It should be noted that the categories of parental schooling in PISA 2000 were somewhat different from the successive years and that Finnish participants did not nominate the “vocational/pre-vocational” category at all. Consideration should also be given to the low percentages of students who belonged to the category whose parents “didn’t go to school” in both countries.

In general, performance parameters improved with increased levels of schooling in both countries. The notable exception to this trend was the higher performance parameters amongst Finnish students whose parents had only completed primary education, compared with those who have completed lower secondary. From Figure 5.1 it can be seen that the percentages of Finnish parents in these two categories were quite similar. It appears from Figures 5.2 and 5.3 that those students who came from homes with upper secondary education considerably outperformed the others in both countries. The gaps between Australian and Finnish students in this category widened considerably in 2006.
Figure 5.2. Student mean performance parameters by fathers’ levels of schooling.
Overall, Figure 5.2 shows that students whose fathers have attained the highest level of schooling performed most highly, and results were typically higher in Finland than in Australia. This trend is repeated in mothers’ levels of schooling in Figure 5.3.
Figure 5.3. Student mean performance parameters by mothers’ levels of schooling

<table>
<thead>
<tr>
<th>Year, Country, Literacy Area</th>
<th>Science</th>
<th>Reading</th>
<th>Maths</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000 Finland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003 Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003 Finland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006 Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006 Finland</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Upper secondary education (aimed at gaining tertiary entrance)**
- **Upper secondary education**
- **Vocational/pre-vocational upper secondary education only (Australia only in 2003 and 2006)**
- **Lower secondary education only**
- **Primary education only**
- **Didn’t go to school**

Student mean performance parameters
Note. Based on SPSS analysis of OECD Student Questionnaire data retrieved from

Once again, the results of the three rounds of PISA surveys were combined to form
Figure 5.4 to give a longitudinal perspective of the acquisition of tertiary education amongst
parents. PISA 2003 and 2006 expanded on the original yes/no question in 2000, to collect
data pertaining to the kind of tertiary education parents completed. Cumulative percentages
of parents with tertiary education in 2003 and 2006 could not be calculated for direct
comparison with the 2000 data as students could nominate more than one category of
education for the parents.

Figure 5.4 shows that the percentages of Australian and Finnish parents who completed
tertiary education increased over the data collection periods. Although both countries
experienced growth in this area, the growth in Finland in 2006 was particularly outstanding.
It would seem that overall Australian society has more tertiary educated parents per capita,
but the recent growth in Finland in this area has been more rapid. It is anticipated the PISA
2009 results will reveal any further trends in this regard.
Figure 5.4. Australian and Finnish parents’ tertiary education

Note. Based on SPSS analysis of OECD Student Questionnaire data retrieved from

Scientific analysis of these inferential statistics, using the Chi-Square test to decide whether categorical variables differ significantly from expectation was undertaken using SPSS as follows:
2000 results:

Fathers:

Pearson Chi-Square value = 56.641
Degrees of freedom = 1
Asymp. significance (2 sided) = .000

\[ x^2(1) = 56.641, \ p < 0.001. \]

Mothers:

Pearson Chi-Square value = 14.893
Degrees of freedom = 1
Asymp. significance (2 sided) = .000

\[ x^2(1) = 14.893, \ p < 0.001. \]

2003 Results:

Each tertiary education category was calculated separately for each of the parental genders (that is, six different calculations all with unique chi-square values). Each calculation had only 1 degree of freedom and all calculations resulted in asymp. significance (2 sided) = .000, except for mothers’ theoretically oriented tertiary category, which resulted in .002.

2006 Results:

Scientific analysis of these inferential statistics, using the Chi-Square test to decide whether categorical variables differ significantly from expectation was undertaken using
SPSS. Each tertiary education category was calculated separately for each of the parental genders (that is, six different calculations, all with unique chi-square values). Each calculation had only 1 degree of freedom and all calculations resulted in asymp. significance (2 sided) = .000, except for fathers’ theoretically oriented tertiary and post-graduate category, which resulted in .007.

Therefore, considering these results, the null hypothesis that Finnish and Australian results for parental tertiary education are the same can be rejected.

Tables 5.1 and 5.2 show a general positive relationship between the higher parental education levels and improved student performance parameters in both countries. Considerable performance differences were especially observable between students from homes with parents of theoretical tertiary training and those of lesser tertiary education. Of note, however, is that although Figure 5.4 shows higher percentages of Australian parents attaining tertiary education compared to their Finnish counterparts Tables 5.1 and 5.2 demonstrate that this does not guarantee higher mean scores for Australian students. Finnish students continue to outperform Australians. Moreover, the difference between Australian and Finnish students who have parents with non-tertiary education was substantial with Finnish students performing considerably higher than Australians as seen in Tables 5.1 and 5.2. The gap in student performance between the tertiary educated and non-tertiary educated parents in Australia was considerably wider than in Finland. This confirms the position of Välijärvi et al. (2002) that Finnish society is more immune from socio-economic factors affecting student performance as previously discussed in Chapters 2 and 3 of this report.
Table 5.1.  

*Australian and Finnish students’ mean performance parameters by fathers’ tertiary education*

<table>
<thead>
<tr>
<th>Year</th>
<th>Australian students</th>
<th>Finnish students</th>
<th>2000</th>
<th>2003</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reading</td>
<td>Reading</td>
<td>Reading</td>
<td>Reading</td>
<td>Reading</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>Maths</td>
<td>Maths</td>
<td>Maths</td>
<td>Maths</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>Science</td>
<td>Science</td>
<td>Science</td>
<td>Science</td>
</tr>
<tr>
<td></td>
<td>Tertiary education</td>
<td>Tertiary education</td>
<td>Tertiary education</td>
<td>Tertiary education</td>
<td>Tertiary education</td>
</tr>
<tr>
<td></td>
<td>general</td>
<td>theoretical</td>
<td>Vocational tertiary</td>
<td>Non-tertiary post-secondary</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>oriented</td>
<td>post-graduate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>Reading</td>
<td>564</td>
<td>563</td>
<td>566</td>
<td>551</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>569</td>
<td>530</td>
<td>549</td>
<td>511</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>557</td>
<td>519</td>
<td>544</td>
<td>506</td>
</tr>
<tr>
<td>2003</td>
<td>Reading</td>
<td>563</td>
<td>523</td>
<td>564</td>
<td>558</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>530</td>
<td>523(^a)</td>
<td>527</td>
<td>518</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>519</td>
<td>546</td>
<td>549</td>
<td>514</td>
</tr>
<tr>
<td>2006</td>
<td>Reading</td>
<td>566</td>
<td>544(^a)</td>
<td>571</td>
<td>570</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>549</td>
<td>544(^a)</td>
<td>572</td>
<td>549</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>550</td>
<td>550</td>
<td>549</td>
<td>528</td>
</tr>
</tbody>
</table>

\(^a\) indicates significant differences between Australian and Finnish students.

a. ANOVA testing upon the plausible values that combined to form the mean performance parameter for mathematics performance in the vocational tertiary category were .003, .010, .018, .016 and .016. These results were unusual as most other ANOVA test results were .000. Nevertheless, these results still show that the null hypothesis, that group means are the same, can be rejected, and an alternative hypothesis, that differences exist between the means, can be adopted.

b. ANOVA testing upon the plausible values that combined to form the mean performance parameter for mathematics performance in the vocational tertiary category were .018, .066, .003, .097 and .080. These results were unusual as most other ANOVA test results were .000. Nevertheless, these results still show that the null hypothesis, that group means are the same, can be rejected, and an alternative hypothesis, that differences exist between the means, can be adopted.

c. ANOVA testing upon the plausible values that combined to form the mean performance parameter for science performance in the vocational tertiary category were .001, .001, .000, .003 and .002. These results were unusual as most other ANOVA test results were .000. Nevertheless, these results still show that the null hypothesis, that group means are the same, can be rejected, and an alternative hypothesis, that differences exist between the means, can be adopted.
Table 5.2.

Australian and Finnish students’ mean performance parameters by mothers’ tertiary education

<table>
<thead>
<tr>
<th></th>
<th>Tertiary education - general</th>
<th>Theoretically oriented tertiary and post-graduate</th>
<th>Vocational tertiary</th>
<th>Non-tertiary post-secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian students 2000</td>
<td>Reading</td>
<td>559</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>564</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>553</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finnish students 2000</td>
<td>Reading</td>
<td>564</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>554</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>557</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian students 2003</td>
<td>Reading</td>
<td>559</td>
<td>533(^a)</td>
<td>524</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>559</td>
<td>522</td>
<td>518</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>563</td>
<td>525(^b)</td>
<td>519</td>
</tr>
<tr>
<td>Finnish students 2003</td>
<td>Reading</td>
<td>557</td>
<td>549(^a)</td>
<td>545</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>563</td>
<td>546</td>
<td>545</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>567</td>
<td>547(^b)</td>
<td>556</td>
</tr>
<tr>
<td>Australian students 2006</td>
<td>Reading</td>
<td>545</td>
<td>508</td>
<td>509</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>551</td>
<td>513(^c)</td>
<td>513</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>563</td>
<td>525</td>
<td>523</td>
</tr>
<tr>
<td>Finnish students 2006</td>
<td>Reading</td>
<td>566</td>
<td>552</td>
<td>542</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>569</td>
<td>551(^c)</td>
<td>541</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>584</td>
<td>566</td>
<td>557</td>
</tr>
</tbody>
</table>
Note. Based on SPSS analysis of OECD Student Questionnaire data retrieved from

a. ANOVA testing upon the plausible values that combined to form the mean performance parameter for
reading performance in the vocational tertiary category were .304, .204, .065, .026 and .114. These results were
unusual as most other ANOVA test results were .000. Consequently, these results show that the null
hypothesis, that group means are the same, cannot be rejected, rendering this particular mean performance
parameter insignificant.

b. ANOVA testing upon the plausible values that combined to form the mean performance parameter for
science performance in the vocational tertiary category were .013, .000, .009, .001 and .008. Again, these
results were unusual as most other ANOVA test results were .000. Nevertheless, these results still show that the
null hypothesis, that group means are the same, can be rejected, and an alternative hypothesis, that differences
exist between the means, can be adopted.

c. ANOVA testing upon the plausible values that combined to form the mean performance parameter for
mathematics performance in the vocational tertiary category were .113, .077, .037, .206 and .350. These results
were unusual as most other ANOVA test results were .000. Consequently, these results show that the null
hypothesis, that group means are the same, cannot be rejected, rendering this particular mean performance
parameter insignificant.

5.2.1.1 Summary

Overall, it would appear from the analysis of parents’ education levels that there is an
increasing trend to acquire higher levels of education amongst both Finnish and Australian
parents. However, the growth rate of parental education in Finland is steeper per capita than
experienced in Australia. There was an observable positive relationship between improved
student performance parameters and the higher levels of parental schooling and tertiary
education in both countries. In general, performance improved with increased parental
education. However, this relationship was not quite so definite amongst the lower ends of
parental education as it was in the upper ends. According to typical trend Finnish students outperformed their Australian counterparts even when percentages of educated Australian parents were higher. It could be argued that these observations confirm the position of Välijärvi et al. (2002) that the Finnish system better compensates for socio-economic disadvantage as discussed in Chapters 2 and 3. Now that specific knowledge about the differences between levels of parental education in Australia and Finland has been uncovered in this section the ramifications of parental education in the context of socio-economic advantage as an influence upon students’ dispositions towards learning will be further explored in the Chapter 7 discussion.

5.2.2 Indicator 2: Frequency of student-parent dialogue

As previously established in the review of literature, language use is embedded with values and preferences (Bourdieu, 1977). Language use in this project was concerned with discussion between parents and students. Bourdieu (1977) differentiated between working-class and bourgeois language arguing that the latter is more intellectual and more likely to follow respected cultural systems. In their 1984 work Bourdieu and Nice explained that bourgeois language is more likely to position a student favourably within academic cultures, which has consequential effects upon performance and career choices and educational success. With this in mind, further interrogation of PISA questions that relate to family dialogue was profitable to gain a clearer picture of influences upon student dispositions.
5.2.2.1 General student-parent discussion

One of the most remarkable differences found between Finnish and Australian students by further analysis of the PISA 2000 Student Questionnaire data was how much more frequently Finnish 15-year-olds reported “just talking” with their parents than Australians did. Question 19f on the 2000 Student Questionnaire reads, “In general, how often do your parents spend time just talking to you?” (OECD, 2000). The dialogue between Finnish parents and teenagers appears to be substantially more frequent, with 78.8% of students reporting that they spend time “just talking” with their parents several times a week, compared with 51.3% in Australia (Figure 5.5).

Figure 5.5. General discussions between parents and 15-year-olds

Chi-square testing of these percentages yielded a significance result of $p < 0.001$, therefore, the null hypothesis that Finnish and Australian results are the same can be rejected, meaning that dialogue between Finnish students and their parents was considerably more frequent than their Australian contemporaries.

As a general trend students’ mean reading performance parameters in both countries tend to improve with increased discussion with their parents. The exception to this trend was that Australian 15-year-olds who reported ‘never’ talking with their parents had the same mean reading performance as those who reported ‘few times a year’ (Table 5.4).

The profiles of the mathematics and science mean parameters were somewhat different to those for reading. Australian students have higher mean performance parameters in the “never” category in both mathematics and science. Nevertheless, a general pattern emerged that shows that students who converse most frequently with their parents also have higher mean performance parameters in all literacy areas, as shown in Table 5.3. The exception to this pattern was the mean mathematics parameters as the ‘several times a week’ category decreased slightly. However, it should be noted that in all areas of analysis of student-parent dialogue, it was common for the highest mean parameters to occur in “several times a month” as opposed to “several times a week”. This was not a reliable trend, however, it was a common one for mathematics. The reader should keep in mind that these scores exist within the context of the percentages shown in Figure 5.5, showing that there were 27.5% more Finns than Australians in the highest mean performance group of ‘several times a week’.
Table 5.3

*Student mean performance parameters by general discussion with parents*

<table>
<thead>
<tr>
<th></th>
<th>Reading mean parameter estimate</th>
<th>Mathematics mean parameter estimate</th>
<th>Science mean parameter estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Australian students</td>
<td>Finnish students</td>
<td>Australian students</td>
</tr>
<tr>
<td>Never</td>
<td>490</td>
<td>501</td>
<td>501</td>
</tr>
<tr>
<td>Few times/year</td>
<td>490</td>
<td>519</td>
<td>507</td>
</tr>
<tr>
<td>Once a month</td>
<td>513</td>
<td>532</td>
<td>521</td>
</tr>
<tr>
<td>Several times a month</td>
<td>530</td>
<td>542</td>
<td>541</td>
</tr>
<tr>
<td>Several times a week</td>
<td>542</td>
<td>552</td>
<td>538</td>
</tr>
</tbody>
</table>


5.2.2.2 *Discussion about schoolwork*

Further investigation into the different types of dialogue that occurred between parents and students showed different trends between the two countries. Question 19d on the 2000 *Student Questionnaire* asked students to rank how often they discussed how well they were doing at school with their parents. When discussing schoolwork, although there was more
dialogue between Australian parents and their 15-year-olds “several times a week”, overall more dialogue occurred in Finnish families in the combined categories of “several times a month” and “several times a week” (Table 5.4). Moreover, of concern was the higher reported frequency of “never” or only a “few times a year” discussing schoolwork amongst Australian families. Not only did the Finns have a higher rate of active discussion in the combined top two categories they also had lower rates of minimal or no discussion.

Table 5.4.

*Student-parent discussion about schoolwork*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>3.5%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Few times a year</td>
<td>11.3%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Once a month</td>
<td>19.1%</td>
<td>21.3%</td>
</tr>
<tr>
<td>Several times a month</td>
<td>29.5%</td>
<td>39.3%</td>
</tr>
<tr>
<td>Several times a week</td>
<td>36.6%</td>
<td>28.7%</td>
</tr>
</tbody>
</table>


Chi-square testing yielded a significance result of \( p < 0.001 \), therefore, the null hypothesis that Finnish and Australian results are the same can be rejected, and it can be concluded that Finnish students are more likely than Australian students to discuss schoolwork with their parents.
A comparison of mean student performances by frequency of discussion about schoolwork showed that Australian performances in reading and science generally tend to improve with increased discussion about schoolwork (Table 5.5). The highest mean performance parameters in mathematics again resided with ‘several times a month’ in Australia. This was also the trend for Finnish students in both reading and mathematics. Finnish mean parameters in these literacy areas rose with increased parental discussion to peak at ‘several times a month’, and then dropped at ‘several times a week’. Nevertheless, the highest reported percentage of Finnish students was at ‘several times a month’, so these results show that the majority of students were performing at the highest mean parameter.

The difference in Australian mean reading parameters between the group of students who reported ‘never’ discussing schoolwork and those who discussed it ‘several times a week’ was quite substantial (71 score points). This gap in Australian performance tended to close somewhat in the mathematics and science literacy areas (57 and 38 points respectively); however in all cases the gaps were considerably larger than those between the Finnish means. It will be remembered that the percentages of Australian students reporting little parental discussion about schoolwork were substantially higher than the Finnish percentages (Table 5.4), so the numbers of students with low mean scores is considered significant.
Table 5.5.

*Student mean performance parameters by student-parent discussion about schoolwork*

<table>
<thead>
<tr>
<th></th>
<th>Reading mean parameter estimate</th>
<th>Mathematics mean parameter estimate</th>
<th>Science mean parameter estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Australian students</td>
<td>Finnish students</td>
<td>Australian students</td>
</tr>
<tr>
<td>Never</td>
<td>471</td>
<td>510</td>
<td>483</td>
</tr>
<tr>
<td>Few times a year</td>
<td>491</td>
<td>533</td>
<td>506</td>
</tr>
<tr>
<td>Once a month</td>
<td>521</td>
<td>551</td>
<td>528</td>
</tr>
<tr>
<td>Several times a month</td>
<td>539</td>
<td>555</td>
<td>542</td>
</tr>
<tr>
<td>Several times a week</td>
<td>542</td>
<td>546</td>
<td>540</td>
</tr>
</tbody>
</table>


5.2.2.3 Discussion about books, film or television

Another area of student-parent dialogue assessed by the 2000 PISA study was discussion about books, film or television. Following in a similar trend to discussion about schoolwork, greater proportions of Australian students reported rarely discussing books, film or television with their parents. The percentages of Finnish students who positively reported discussing books, films or television was considerably more as shown in Table 5.6.
Table 5.6.

Student-parent discussion of books, film or television

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>15.0%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Few times/year</td>
<td>23.6%</td>
<td>17.2%</td>
</tr>
<tr>
<td>Once a month</td>
<td>19.2%</td>
<td>21.4%</td>
</tr>
<tr>
<td>Several times a month</td>
<td>24.6%</td>
<td>31.4%</td>
</tr>
<tr>
<td>Several times a week</td>
<td>17.5%</td>
<td>21.8%</td>
</tr>
</tbody>
</table>


Chi-square testing yielded a significance result of $p<0.001$, therefore, the null hypothesis that Finnish and Australian results are the same can be rejected and it can be concluded that from all appearances Finnish students discussed books, films and televisions with their parents more frequently than Australians.

Such high percentages of Australian students reporting ‘few times a year’ or ‘never’ discussing books, films and television is concerning as the mean performances amongst those groups were considerably lower in all literacy areas (Table 5.7). The lowest performing groups in Finland were significantly higher than the lowest performing groups in Australia. Again in both countries, performance generally increased as discussion with parents increased, with mathematics being the exception to the trend, peaking at ‘several times a month’ in both countries. Finnish students also followed this trend in science;
however, it should be noted once again that the ‘several times a month’ category also had the highest percentage of Finnish students.

Table 5.7.

*Student mean performance parameters by discussion about books, film or television with parents*

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Reading mean parameter estimate</th>
<th>Mathematics mean parameter estimate</th>
<th>Science mean parameter estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian students</td>
<td>Finnish students</td>
<td></td>
<td>Australian students</td>
</tr>
<tr>
<td>Never</td>
<td>484</td>
<td>509</td>
<td>502</td>
</tr>
<tr>
<td>Few times/year</td>
<td>501</td>
<td>526</td>
<td>511</td>
</tr>
<tr>
<td>Once a month</td>
<td>531</td>
<td>548</td>
<td>538</td>
</tr>
<tr>
<td>Several times a</td>
<td>558</td>
<td>561</td>
<td>556</td>
</tr>
<tr>
<td>month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several times a</td>
<td>562</td>
<td>565</td>
<td>549</td>
</tr>
<tr>
<td>week</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


_Talking about books with others._ Similar to Question 19, Question 35c in the 2000 *Student Questionnaire* also asked students to indicate their affinity for holding general
discussion about books with others. Results were quite similar between the two countries with few 15-year-olds in either country ‘strongly agreeing’ that they liked to discuss books. The majority of students disagreed that they would like to engage in such activity (Figure 5.6). Chi-square testing yielded a significance result of $p < 0.001$, therefore the null hypothesis that Finnish and Australian results are the same can be rejected. To minimise potential cultural differences, for example the possible differences between the two countries meanings of “agree” or “strongly agree” (OECD, 2001), these results were viewed as country profiles.

*Figure 5.6. Percentages of students who like to talk about books with other people*

![Bar chart showing percentages of students who like to talk about books with others by country and level of agreement.](chart.png)


Although few students indicated that they liked talking about books the mean performance parameters in all three literacy areas clearly improved with increased
differences. Further, following the typical trend, Finnish mean parameters were unmistakably ahead of Australian parameters in all areas (Table 5.8).

Table 5.8.

*Student mean performance parameters by students who like to talk about books with others*

<table>
<thead>
<tr>
<th></th>
<th>Reading</th>
<th></th>
<th>Mathematics</th>
<th></th>
<th>Science</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean parameter estimate</td>
<td>mean parameter estimate</td>
<td>mean parameter estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian students</td>
<td>Finnish students</td>
<td>Australian students</td>
<td>Finnish students</td>
<td>Australian students</td>
<td>Finnish students</td>
<td></td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>489</td>
<td>505</td>
<td>508</td>
<td>515</td>
<td>494</td>
<td>509</td>
</tr>
<tr>
<td>Disagree</td>
<td>527</td>
<td>547</td>
<td>533</td>
<td>537</td>
<td>528</td>
<td>538</td>
</tr>
<tr>
<td>Agree</td>
<td>563</td>
<td>583</td>
<td>552</td>
<td>553</td>
<td>553</td>
<td>561</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>586</td>
<td>601</td>
<td>562</td>
<td>570</td>
<td>570</td>
<td>582</td>
</tr>
</tbody>
</table>


5.2.2.4 Discussion about politics

In contrast to the Finnish dominance in other areas of discussion, Australian parents were more likely to discuss politics with their 15-year-olds. Although many teenagers ‘never’ or only a ‘few times a year’ discussed politics with their parents (56.1% in Australia and 58.3% in Finland), those who did discuss politics tended to do so more frequently in
Differences between Australian and Finnish student dispositions

Australia, as shown below in Table 5.9. Of note, voting is compulsory in Australia and not so in Finland, but whether that has any impact is debatable. The relationship between this factor and the results in Table 5.9 would need to be established by further research.

Table 5.9.

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>26.1%</td>
<td>25.1%</td>
</tr>
<tr>
<td>Few times a year</td>
<td>30.0%</td>
<td>33.2%</td>
</tr>
<tr>
<td>Once a month</td>
<td>14.6%</td>
<td>21.4%</td>
</tr>
<tr>
<td>Several times a month</td>
<td>16.9%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Several times a week</td>
<td>12.5%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>

Note. Based on SPSS analysis of OECD 2000 Student Questionnaire data retrieved from


Chi-square testing yielded a significance result of $p<0.001$, therefore, the null hypothesis that Finnish and Australian results are the same can be rejected, and it can be stated that although students rarely discussed politics with the parents, Australian students were more likely to do so.

When comparing mean student performance parameters by frequency of discussion about politics with parents, again performances of students in both countries improved with increased discussion in all literacy areas. In this instance, Australians outperformed the Finns
in most literacy areas in the higher frequency categories of ‘several times a month’ and ‘several times a week’, reflecting the more frequent conversations that occurred amongst Australians. However, it cannot go without mention that the Finns outperformed the Australians in all literacy areas in the categories of ‘never’ and ‘few times a year’. Again, the gaps between the highest and lowest performing groups in Finland were considerably narrower than the same gaps in the Australian results (Table 5.10).

Table 5.10.

<table>
<thead>
<tr>
<th></th>
<th>Reading mean parameter estimate</th>
<th>Mathematics mean parameter estimate</th>
<th>Science mean parameter estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Australian students</td>
<td>Finnish students</td>
<td>Australian students</td>
</tr>
<tr>
<td>Never</td>
<td>485</td>
<td>520</td>
<td>500</td>
</tr>
<tr>
<td>Few times/year</td>
<td>512</td>
<td>541</td>
<td>520</td>
</tr>
<tr>
<td>Once a month</td>
<td>547</td>
<td>567</td>
<td>545</td>
</tr>
<tr>
<td>Several times a</td>
<td>569</td>
<td>576</td>
<td>563</td>
</tr>
<tr>
<td>month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several times a</td>
<td>591</td>
<td>582</td>
<td>581</td>
</tr>
<tr>
<td>week</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.3 Summary

This analysis has found positive relationships between the frequency of student-parent discussion and mean student performance parameters in reading. Where parents talked with their teenagers more frequently student mean performance increased, in all but one result. This was particularly visible in the analysis of general conversation (‘just talking’) where the frequency of discussion was substantially higher amongst the Finns resulting in a greater percentage of students performing at the highest average. It seems from this analysis that the frequency of dialogue between students and parents has a direct influence upon student reading performance.

This trend was not as clear in the other two literacy areas of mathematics and science, with the exception of discussion about politics. Overall, the links between mathematics and science performances and student-parent discussion did not appear to be as distinct as the reading literacy results. (Further investigation could determine whether the relationship between reading-literacy and student-parent discussion was causal). Nevertheless, it would be fair to make the generalisation that increased discussion has a favourable influence upon mean performance parameters in all literacy areas. Finnish students report higher frequencies of discussion in all areas except politics. From these results it can be confidently stated that whichever country reports the highest frequency of discussion also has the highest mean performance parameters.

To this end, there was an observable relationship between student dispositions, as operationalised by student-parent dialogue about schoolwork and related topics, and student performance, where increased dialogue was linked with improved performance. Overall,
Finnish students reported higher frequencies of dialogue with their parents so it could be that this was a contributing factor to their outstanding performance in PISA. Further, in general Finnish mean performance parameters were higher than Australia’s, particularly at the bottom end. The implications of these observations are discussed further in Chapter 7.
6.0 RESULTS: STUDENTS’ PERSONAL DISPOSITIONS

6.1 Introduction

Having presented the results of the influences of home environments upon student dispositions in the previous chapter, this chapter presents the results of data analysis of students’ personal dispositions. These results stand out, as they are student disposition specific, rather than being derived from external influences upon dispositions. These results are personal, reflective of students’ opinions and choices.

6.2 Measures of students’ personal dispositions

The three indicators for students’ personal dispositions are self-ratings of the importance of doing well, interest and enjoyment, and effort. Results from these three indicators were literacy-area specific so have been presented within the contexts of literacy areas. Overall observations and discussion about these indicators and differences between Australian and Finnish students are made in Chapter 7.

6.2.1 Indicator 3: Student ratings of the importance of doing well

As discussed in Chapter 2, student ratings of the importance of doing well in school subjects serve as indicators of dispositions towards learning. Question 36 on the Student
Questionnaire for PISA 2006, asked students to nominate the importance of doing well in school subjects which provided insights into students’ dispositions towards academic achievement (Figure 6.1). Although cross-country comparisons are problematic using PISA data (OECD, 2007) the results below were useful to establish intra-country profiles.

Overall, a clear majority of Australian students deemed academic performance to be ‘very important’ or ‘important’, particularly in language studies and mathematics (both 94%). Science ratings, although positive, did not boast the same overwhelming response (72.5%). Finnish students showed preference towards the ‘important’ rating in all subject areas. Overall, it seemed that as a cohort they ranked the importance of ‘doing well’ in mathematics, language and science in that order. Although not all subject areas were rated with the same importance all attracted over half of the Finnish cohort in the combined categories of ‘important’ or ‘very important’, 61.9% in science, 79.8% in language, and 86.2% in mathematics.
Figure 6.1. Student ratings of the importance of “doing well” in school subjects


SPSS analysis of these inferential statistics was undertaken using the chi-square test to decide whether categorical variables differ significantly. Each literacy area was calculated separately, that is, three different calculations all with unique chi-square values. Each calculation had 3 degrees of freedom and all calculations resulted in asymp. significance (2 sided) = .000. Therefore, considering these results the null hypothesis that Finnish and Australian results are the same can be rejected and it can be concluded that a greater majority of Australian students deemed doing well important.

Clearly, students who place ‘no importance’ upon academic achievement also had the lowest performance parameters, as shown in Figure 6.2. As per typical trends the corresponding performance parameters of Finnish students were higher than those of the
Differences between Australian and Finnish student dispositions

Australians’. However this did not reflect positive student dispositions towards the importance of doing well in schoolwork in Finland as many Finnish students who nominated the ‘little importance’ category had significantly higher scores than the Australians who nominated the ‘important’ category in all three literacy areas.

*Figure 6.2*. Student mean performance parameters by student ratings of the importance of “doing well”

It would seem from Figures 6.1 and 6.2 that in general Australian students deemed ‘doing well’ of greater importance than their Finnish counterparts. However, their actual performance parameters lagged behind. There seems to be a disparity between dispositions and performance amongst Australian students, which will be further explored in the coming sections of this chapter.

6.2.2 Indicator 4: Student ratings of interest and enjoyment

As student ratings of interest and enjoyment were literacy-area specific, findings presented below are likewise. Overall statements about these two indicators in the context of Australian and Finnish students are presented by way of discussion in Chapter 7.

6.2.2.1 Interest and enjoyment in reading (focus on PISA 2000)

Reading has been shown to be vital in overcoming social disadvantage (OECD, 2002b; Guthrie & Wigfield, 2003) and social disadvantage has been shown to be a proven contributor to lower academic performance (Ho & Willms, 1996). Therefore, investigation into the internalisation of the importance of reading helps to map the landscape of student dispositions towards learning. The PISA 2000 Student Questionnaire asked students to nominate their degree of interest and enjoyment in reading. As discussed in Chapter 2, interest and enjoyment factors, including interest and enjoyment in reading, are indicators of student dispositions.
When results are cautiously viewed in terms of majorities and minorities, the Finnish and Australian profiles were not dissimilar, as shown in Figure 6.3. Chi-square testing yielded a significance result of \( p < 0.001 \), therefore the null hypothesis that Finnish and Australian results are the same can be rejected and we can say that in this instance most students disagreed that reading was a favourite hobby, albeit in both countries.

*Figure 6.3. Percentages of students who indicated that reading is their favourite hobby*


In both countries and across all literacy areas, performance increased with agreement toward reading as a favourite hobby, as shown in Table 6.1. According to the usual trend, Finnish students outperformed Australian students in mean parameters in all but one category, mathematics ‘agree’. In particular, Finnish students scored considerably higher than Australian students in reading literacy.
Table 6.1.

*Student mean performance parameters by student agreement towards reading being a favourite hobby*

<table>
<thead>
<tr>
<th></th>
<th>Reading mean parameter estimate</th>
<th>Mathematics mean parameter estimate</th>
<th>Science mean parameter estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Australian</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>students</td>
<td>485</td>
<td>508</td>
<td>508</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>526</td>
<td>532</td>
<td>532</td>
</tr>
<tr>
<td>Disagree</td>
<td>560</td>
<td>551</td>
<td>551</td>
</tr>
<tr>
<td>Agree</td>
<td>582</td>
<td>553</td>
<td>553</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>606</td>
<td>566</td>
<td>566</td>
</tr>
</tbody>
</table>

| **Finnish**    |                               |                                   |                               |
| students       | 500                           | 519                               | 505                           |
| Strongly disagree | 541                           | 535                               | 533                           |
| Disagree       | 574                           | 545                               | 556                           |
| Agree          | 606                           | 569                               | 584                           |


These results confirmed the positive relationship between increased interest and enjoyment and improved reading performance, as discussed in Chapter 2. It would seem that the majority of students in both countries did not enjoy the practice of reading. To this end, the analysis of data from PISA 2000 does not offer enough evidence about student dispositions to draw conclusions. Therefore, this study also explored the PISA 2003 and 2006 data to build upon the knowledge of student dispositions in this area.
6.2.2.2 Interest and enjoyment in mathematics (focus on PISA 2003)

With respect to mathematics and its personal importance, Figure 6.4 shows that within Finland the ‘disagree somewhat’ category ranked most highly and that the majority of Finnish students nominated some degree of disagreement. Within the Australian profile of results the “agree somewhat” category scored the largest percentage. In contrast to Finnish students, the majority of Australians indicated some level of agreement towards the personal importance of mathematics. Chi-square testing yielded a significance result of \( p < 0.001 \), therefore results can be treated as significant.

*Figure 6.4. Percentages of students who indicated mathematics is personally important*


When comparing mean performance parameters according the personal importance of mathematics, Finnish students outperformed Australian students in reading literacy, but
the results were mixed for mathematics and science. For example, Australian students performed more strongly in the ‘disagree’ category for mathematics and science, by 8 and 11 score points respectively. Although more Australian students indicated agreement towards the personal importance of mathematics in the PISA 2000 Student Questionnaire (Figure 6.4), those Finns who nominate the same categories significantly outperform their Australian counterparts (Table 6.2).

Table 6.2.

*Student mean performance parameters by student agreement towards the personal importance of mathematics*

<table>
<thead>
<tr>
<th></th>
<th>Reading mean parameter estimate</th>
<th>Mathematics mean parameter estimate</th>
<th>Science mean parameter estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Australian students</td>
<td>Finnish students</td>
<td>Australian students</td>
</tr>
<tr>
<td>Disagree</td>
<td>534</td>
<td>537</td>
<td>516</td>
</tr>
<tr>
<td>Disagree somewhat</td>
<td>539</td>
<td>547</td>
<td>537</td>
</tr>
<tr>
<td>Agree somewhat</td>
<td>523</td>
<td>553</td>
<td>531</td>
</tr>
<tr>
<td>Agree</td>
<td>543</td>
<td>579</td>
<td>551</td>
</tr>
</tbody>
</table>

The results from the PISA 2003 Student Questionnaire showed a downturn in students’ dispositions towards mathematics compared to those in the reading literacy area, especially in Australia (Figures 6.5 and 6.6). In terms of interest in mathematics Figure 6.5 showed that Australian attitudes were split approximately 50:50 in positive and negative responses. Within the Finnish profile more than half of the students indicated ‘disagree’ or ‘strongly disagree’. Chi-square testing yielded a significance result of $p < 0.001$, therefore the results can be treated as significant.

*Figure 6.5. Students’ reported interest in mathematics*

![Figure 6.5. Students’ reported interest in mathematics](image)


Table 6.3 shows that the Finnish disinterest in mathematics does not necessarily equate to lower performance parameters as they outperformed Australian students. These results show that in general student mean performance parameters improved with increased interest in mathematics. Nevertheless, when compared to Finnish students the more positive student
interest profile of Australian students did not produce higher results. This finding was contrary to previous findings as discussed in the literature (Fay, 2001; Porter, 2007; Rutter, 1983), as it would normally be expected that increased interest in learning be linked with improved performance.

Table 6.3.

*Student mean performance parameters by students’ reported interest in mathematics*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maths</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>556</td>
<td>536</td>
</tr>
<tr>
<td>Agree</td>
<td>534</td>
<td>529</td>
</tr>
<tr>
<td>Disagree</td>
<td>516</td>
<td>524</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>494</td>
<td>518</td>
</tr>
</tbody>
</table>


In terms of enjoyment in mathematics shown in Figure 6.6, disagreement within both countries was sharp, with more than half of the students in both countries nominating negative responses. When observing country profiles it appears that in general Australian students were a little more positive as a higher percentage of Australians indicated some level of agreement. Chi-square testing yielded a significance result of $p<0.001$, therefore the results can be treated as significant.
Figure 6.6. Student ratings of agreement toward the enjoyment of mathematics

<table>
<thead>
<tr>
<th>Country</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>10%</td>
<td>40%</td>
<td>40%</td>
<td>5%</td>
</tr>
<tr>
<td>Finland</td>
<td>5%</td>
<td>30%</td>
<td>35%</td>
<td>10%</td>
</tr>
</tbody>
</table>


Table 6.4 shows that the enjoyment of mathematics in general has a positive relationship with student mean performance parameters within both countries. Nevertheless, the seemingly more positive dispositions towards mathematics amongst Australian students did not equate to higher performance parameters. Finnish student maintained their lead, albeit with a majority of negative student attitudes.
Table 6.4.

*Student mean performance parameters by ratings of agreement towards enjoyment of mathematics*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maths</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>559</td>
<td>536</td>
</tr>
<tr>
<td>Agree</td>
<td>546</td>
<td>534</td>
</tr>
<tr>
<td>Disagree</td>
<td>517</td>
<td>522</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>499</td>
<td>520</td>
</tr>
</tbody>
</table>


More specifically, students were asked to indicate their enjoyment of reading about mathematics in the *PISA 2003 Student Questionnaire*. This data was useful for comparison with the previous ‘enjoyment of mathematics’ results to compare students’ general attitudes with their attitudes in practice. Reading about mathematics was considered to indicate positive dispositions towards learning. Figure 6.7 shows that an overwhelming majority of students in both countries indicated disagreement towards reading about mathematics. Chi-square testing yielded a significance result of $p < 0.001$, therefore difference between results can be treated as significant.
Figure 6.7. Students’ ratings of agreement towards enjoyment in reading about mathematics


Table 6.5 shows that student performance has a strong relationship with enjoyment of reading about mathematics in both countries, and that Finnish students again had higher performance parameters.
Table 6.5.

*Student mean performance parameters by ratings of agreement towards enjoyment in reading about mathematics*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maths</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>553</td>
<td>524</td>
</tr>
<tr>
<td>Agree</td>
<td>541</td>
<td>529</td>
</tr>
<tr>
<td>Disagree</td>
<td>525</td>
<td>529</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>499</td>
<td>517</td>
</tr>
</tbody>
</table>


By comparing the results for general enjoyment in mathematics (Figure 6.6 and Table 6.4) with the results for enjoyment of reading about mathematics (Figure 6.7 and Table 6.5) it can be seen that general attitudes aligned with mathematics-specific attitudes in both countries. In terms of interest and enjoyment in mathematics clear patterns within both countries showed strong relationships between positive dispositions and student performance as expected (OECD, 2001, 2004, 2007). Notwithstanding this observation, it would appear that Australian students more readily nominated overall positive dispositions towards mathematics. Nonetheless this did not equate to higher mean student performance levels when compared with Finnish students. Somehow, Finnish results remained significantly higher even though the majority of students indicated negative dispositions towards mathematics.
Therefore, if ‘interest and enjoyment’ are indicative of positive student dispositions and have a positive relationship with student performance, as the literature review suggests, then it is questionable why Australians performed below their Finnish counterparts when they seemingly have more positive dispositions. Furthermore there appears to be disparities between dispositions and performance amongst Australian and Finnish students, which are discussed further in Chapter 7.

6.2.2.3 Interest and enjoyment in science (focus on PISA 2006)

The PISA 2006 study took a particular interest in student dispositions towards learning science. Once again, a cautious approach to inter-country comparison was taken and unless otherwise stated the following findings are presented in the context of country profiles, where general trends are compared with caution, forsaking direct comparison of real figures.

Students’ opinions of the personal relevance of science. The Student Questionnaire for PISA 2006 (OECD, 2006) asked students to indicate the personal relevance of science. Within the Australian profile a clear majority of students deemed science personally relevant in the combined ‘agree’ and ‘strongly agree’ categories, but a significant percentage of students also gave negative responses. The most popular response category was ‘agree’.

Within the Finnish profile the ‘strongly’ categories were not as popular with the majority of students preferring the median ‘agree’ or ‘disagree’ categories. ‘Disagree’ was the most popular response and just over half of Finnish students reported their disagreement
in one of the negative categories. Chi-square testing yielded a significance result of $p < 0.001$ therefore differences between results can be treated as significant.

\[\text{Figure 6.8. Student ratings of agreement towards the personal relevance of science}\]

![Bar chart showing student ratings of agreement in Australia and Finland](chart.png)


Student mean performance parameters improved with increased agreement towards the relevance of science in all cases as shown in Table 6.6. Once again by comparison the performance parameters of Finnish students were higher than those belonging to Australian students.
Table 6.6.

*Student mean performance parameters by student agreement towards the personal relevance of science*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>583</td>
<td>557</td>
</tr>
<tr>
<td>Agree</td>
<td>540</td>
<td>522</td>
</tr>
<tr>
<td>Disagree</td>
<td>497</td>
<td>488</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>466</td>
<td>463</td>
</tr>
</tbody>
</table>


From both the country profiles it would appear that dispositions of Australian students towards the relevance of science were more positive yet their performance parameters did not follow suit. It would seem that Finnish students did not respond so positively to the personalisation of study, nevertheless they maintained superior performance scores. The following sections on the value of science in society and dispositions towards the acquisition of knowledge may shed light on this disparity between dispositions and performance between the two countries.

*Students’ opinions of the value of science in society.* Question 18 f on the Student Questionnaire for 2006 was of interest as it included the word ‘valuable’. This was the only question in either of the three student questionnaires where value was measured directly. An overwhelming majority of Finnish students (93%) deemed science valuable to society.
(Figure 6.9) even though 52\% of the same students disagreed upon the personal relevance of science (Figure 6.8). From this evidence, it appears that the collectivist mentality of Finnish students may have emerged (Sahlberg, 2007; Simola, 2005) and for them study may not be as personal as it is societal.

Nevertheless it seems the value of science was high within both countries as a large majority of Australian students also positively indicated highly valuing science. Chi-square testing yielded a significance result of \( p < 0.001 \), therefore difference between results can be treated as significant.

*Figure 6.9. Student ratings of agreement towards the value of science in society*

Note. Based on SPSS analysis of OECD 2006 Student Questionnaire data retrieved from

Table 6.7 shows that a positive relationship existed between placing value upon science in society and student performance, albeit in both countries. However, as in previous results,
the performance parameters of Finnish students were typically higher than those belonging to Australian students.

Table 6.7.

*Student mean performance parameters by student agreement towards the value of science in society*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>571</td>
<td>549</td>
</tr>
<tr>
<td>Agree</td>
<td>517</td>
<td>505</td>
</tr>
<tr>
<td>Disagree</td>
<td>449</td>
<td>441</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>402</td>
<td>386</td>
</tr>
</tbody>
</table>


Simola (2005) and Sahlberg (2007) argued that Finnish society has a collectivist mentality and tends to drift towards social consensus even within its schooling culture. The differences between the internalisation of personal importance and societal importance of science in Finnish students, as shown by the above results, may support Simola’s and Sahlberg’s claims. This key point is discussed further in Chapter 7.

*Do students like to acquire scientific knowledge?* Considering science relevant or valuable is not the same as enjoying it. Question 16d on the *Student Questionnaire for PISA 2006* asked students to rate on a scale of agreement how much they enjoyed acquiring
knowledge in science, which gives an indication of student dispositions towards the acquisition of its knowledge.

Finnish students nominated strong agreement towards the enjoyment of acquiring knowledge with nearly three-quarters of the cohort offering positive responses (Figure 6.10). So although the majority of Finnish students did not deem science personally relevant (Figure 6.8), they valued its importance to society (Figure 6.9) and enjoyed the acquisition of knowledge (Figure 6.10 below).

Not dissimilar to the Finnish profile the majority of Australian students also indicated agreement towards enjoying acquiring knowledge in science. However, it must also be noted that over a third of Australian students indicated disagreement in this regard. Chi-square testing yielded a significance result of $p < 0.001$, therefore differences between results are treated as significant.
Figure 6.10. Student ratings of agreement towards the enjoyment of acquiring scientific knowledge


As with all previous measures of students’ attitudes mean performance improved with increased agreement towards the enjoyment of acquiring scientific knowledge, especially in science literacy parameters. Again, Finnish students outperformed Australian students in all literacy areas, as shown in Table 6.8.
Table 6.8.

Student mean performance parameters by students indicating enjoyment of acquiring knowledge in science

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>595</td>
<td>567</td>
</tr>
<tr>
<td>Agree</td>
<td>538</td>
<td>521</td>
</tr>
<tr>
<td>Disagree</td>
<td>481</td>
<td>475</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>451</td>
<td>447</td>
</tr>
</tbody>
</table>


It would seem that Finnish students were more agreeable towards the enjoyment of acquiring scientific knowledge than Australian students. The differences between the students’ dispositions towards learning in both countries are becoming more apparent with observable relationships between student dispositions and performance in this section of the report.

Are students interested in learning science? Similar to the previous data, question 16f on the Student Questionnaire for PISA 2006 asked students to rate their agreement towards being interested in learning about science. An interest in learning reflects positive student dispositions, making this data useful to this project. However, it must be reiterated that due to cross-cultural differences the PISA data was treated with caution and that these results were observed within country profiles. Notwithstanding this, the two country profiles were
very similar, as shown in Figure 6.11. The majority of students indicated an interest in learning in both countries. Chi-square testing yielded a significance result of \( p < 0.001 \), therefore differences between results can be treated as significant.

Figure 6.11. Student ratings of agreement towards an interest in learning about science


Student mean performance parameters improved with increased interest in learning about science, especially scores in scientific literacy followed by mathematics. As per established trends, students in Finland outperformed Australian students in all literacy areas, as shown in Table 6.9.
Table 6.9.

*Student mean performance parameters by indicating interest in learning about science*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>585</td>
<td>557</td>
</tr>
<tr>
<td>Agree</td>
<td>540</td>
<td>523</td>
</tr>
<tr>
<td>Disagree</td>
<td>491</td>
<td>484</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>457</td>
<td>453</td>
</tr>
</tbody>
</table>


*Do students like to read about science?* Question 16b on the *Student Questionnaire* for PISA 2006 asked students to indicate on a scale of agreement how much they liked to read about science. As previously established in the literature review chapter a strong relationship exists between reading proficiency and academic performance (OECD, 2001, 2004, 2007). Moreover, reading is associated with the acquisition of knowledge and therefore these results were useful in adding to the picture of students valuing education. Results in Figure 6.12 below were once again treated with caution and viewed in terms of overall country profiles (OECD, 2007).

Overall, a clear majority of Finnish students indicated they liked reading about science, as shown in Figure 6.12. This observation was not surprising considering the strength of the Finnish reading literacy results (OECD, 2001, 2004, 2007). These results complemented the data in Figures 6.10 and 6.11 that shows that Finnish students liked to
acquire scientific knowledge and were interested in learning about science. These results confirmed the positive influence of reading practices upon learning and performance.

On the other hand, less than half of the Australian cohort indicated that they liked to read about science. Disagreement was clearly dominant in the Australian profile in this instance. So although a clear majority of Australian students deemed science relevant (Figure 6.8), valuable (Figure 6.9) and interesting (Figure 6.11), most did not like to read about science (Figure 6.12 below). Chi-square testing yielded a significance result of $p < 0.001$, therefore differences between results can be treated as significant.

*Figure 6.12. Student ratings of agreement towards liking to read about science*

![Bar chart showing student ratings of agreement towards liking to read about science in Australia and Finland.](chart.png)


Table 6.10 shows that student mean performance parameters improved with increased agreement towards liking to read about science in both countries, especially in science.
Within the Australian context, concern is raised about the high percentages of students belonging to the categories of disagreement and their low mean performance parameters. Comparatively, students in Finland had much higher mean performance parameters and the majority of their students belonged to the highest parameter groups in the ‘agree’ and ‘strongly agree’ categories.

Table 6.10.

*Student mean performance parameters by ratings of agreement towards liking to read about science*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>598</td>
<td>566</td>
</tr>
<tr>
<td>Agree</td>
<td>555</td>
<td>535</td>
</tr>
<tr>
<td>Disagree</td>
<td>506</td>
<td>496</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>464</td>
<td>459</td>
</tr>
</tbody>
</table>


Within the Australian profile, there seems to be a clear difference between nominated dispositions as evident in interest and enjoyment in science and supporting educational practice, namely reading. Although the majority of Australian students tended toward positive dispositions in science they did not necessarily follow through with positive dispositions toward reading practices in science. The implications of this observation are further discussed in Chapter 7.
6.2.3 Indicator 5: Student ratings of effort

Similar to interest and enjoyment, the results from the fifth indicator, student ratings about effort in learning, were literacy area specific in PISA 2003 and 2006. The PISA 2000 study also asked students to rate their effort, although questions were not literacy area specific. Therefore, results below are presented according to chronological PISA studies so that effort in mathematics (PISA 2003) and science (PISA 2006) can be observed within their contexts. Wider population generalisations are made in Chapters 7 and 8 when conclusions are drawn about Australian and Finnish results.

6.2.3.1 Effort in learning (focus on PISA 2000)

Following on further from the questions posed in the PISA 2000 Student Questionnaire, the PISA 2000 Cross-Curriculum Competencies Questionnaire (CCCQ) asked students to rate themselves on their effort. CCCQ question 1/7 asked students to respond to the following statement: “When studying, I work as hard as possible.” This particular statement was chosen by this project for further analysis, as hard work is indicative of positive dispositions towards learning (Fay, 2001; Porter, 2007).

As previously explained, it must be noted that students’ perceptions of hard work may be culturally embedded and therefore not perfectly comparable. Accordingly, the information in Figure 6.13 was viewed in terms of majorities and minorities within country profiles. Within the Australian profile students most frequently reported working as hard as possible ‘often’. The Finnish profiles shows students recorded their highest frequency in the
'sometimes' category. Chi-square testing yielded a significance result of $p < 0.001$, therefore the null hypothesis that Finnish and Australian results are the same can be rejected.

**Figure 6.13.** Percentages of students who reported working “as hard as possible”

![Bar chart showing percentages of students who reported working “as hard as possible” in Australia and Finland.](chart)


In general, mean performance parameters increased with increased effort for both countries, as shown in Table 6.11. (The only exception to this trend was the “almost always” performance of Australian students in science.) Moreover, the mean performance parameters of Finnish students were typically higher than those belonging to Australian students in all instances.
Table 6.11.

*Student mean performance parameters by reports of working “as hard as possible”*

<table>
<thead>
<tr>
<th></th>
<th>Reading mean parameter estimate</th>
<th>Mathematics mean parameter estimate</th>
<th>Science mean parameter estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Australian</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Almost never”</td>
<td>488</td>
<td>507</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>516</td>
<td>512</td>
<td>510</td>
</tr>
<tr>
<td>“Sometimes”</td>
<td>525</td>
<td>529</td>
<td>534</td>
</tr>
<tr>
<td></td>
<td>547</td>
<td>534</td>
<td>538</td>
</tr>
<tr>
<td>“Often”</td>
<td>538</td>
<td>539</td>
<td>534</td>
</tr>
<tr>
<td></td>
<td>556</td>
<td>546</td>
<td>543</td>
</tr>
<tr>
<td>“Almost always”</td>
<td>538</td>
<td>540</td>
<td>532</td>
</tr>
<tr>
<td></td>
<td>565</td>
<td>552</td>
<td>554</td>
</tr>
</tbody>
</table>


Working hard does not necessarily equate to efficiency or productivity, therefore question 20 on the CCCQ collected data specific to the acquisition of knowledge and skills. The graphed results in Figure 6.14 show that two country profiles were very similar in all categories. Again, when looking at the results in terms of majorities, “often” was the most frequent category in both of the profiles. Chi-square testing yielded a significance result of $p<0.001$, therefore the null hypothesis that results are the same can be rejected for both countries.
Figure 6.14. Percentages of students who reported doing their best to acquire knowledge and skills


With the exception of the ‘almost never’ category in mathematics, Finnish students had higher mean parameters in all categories of doing their best to acquire knowledge and skills (Table 6.12). Mean parameters increased with increased effort in all cases.
Table 6.12.

*Student mean performance parameters by best effort to acquire knowledge and skills*

<table>
<thead>
<tr>
<th></th>
<th>Reading</th>
<th>Mathematics</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean parameter estimate</td>
<td>mean parameter estimate</td>
<td>mean parameter estimate</td>
</tr>
<tr>
<td><strong>Australian students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Almost never</td>
<td>481</td>
<td>505</td>
<td>557</td>
</tr>
<tr>
<td>Sometimes</td>
<td>508</td>
<td>510</td>
<td>545</td>
</tr>
<tr>
<td>Often</td>
<td>542</td>
<td>545</td>
<td>557</td>
</tr>
<tr>
<td>Almost always</td>
<td>557</td>
<td>557</td>
<td>553</td>
</tr>
<tr>
<td><strong>Finnish students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Almost never</td>
<td>493</td>
<td>488</td>
<td>502</td>
</tr>
<tr>
<td>Sometimes</td>
<td>524</td>
<td>519</td>
<td>516</td>
</tr>
<tr>
<td>Often</td>
<td>558</td>
<td>547</td>
<td>549</td>
</tr>
<tr>
<td>Almost always</td>
<td>593</td>
<td>572</td>
<td>578</td>
</tr>
</tbody>
</table>


6.2.3.2 Effort in mathematics (focus on PISA 2003)

The *PISA 2003 Student Questionnaire* gathered data about students’ effort towards the study of mathematics. Again, motivating factors in students were not studied here (for example, competition or workplace aspirations), nevertheless their responses about making an effort in mathematics were valuable in terms of measuring student dispositions within each country (Figure 6.15).
Chi-square testing yielded a significance result of $p < 0.001$, therefore differences between results can be treated as significant. Within the Australian profile, an overwhelming majority of students agreed that effort has worth, with the combined categories of ‘agree’ and ‘strongly agree’ accounting for approximately 85% of students. Within the Finnish profile, results were also high in the agreement categories, with approximately 70% of students in these combined categories.

*Figure 6.15.* Student ratings of agreement towards whether making an effort in mathematics is “worth it”

![Bar chart showing student ratings of agreement towards whether making an effort in mathematics is “worth it.”](chart.png)


When comparing mean student performance parameters by student effort in mathematics the Finnish results took the typical lead ranking more highly than Australian results (Table 6.13). However of note within both countries was the similarity of results in the middle two categories of ‘agree’ and ‘disagree’. Contrastingly, mean performance
parameters were significantly lower in the ‘strongly disagree’ category, and significantly higher in the ‘strongly agree’ category. This showed that relationships exist within both countries between students’ strong opinions of the worth of mathematics and their performances.

Table 6.13.

*Student mean performance parameters by student agreement towards whether making an effort in mathematics is “worth it”*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maths</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>546</td>
<td>539</td>
</tr>
<tr>
<td>Agree</td>
<td>518</td>
<td>521</td>
</tr>
<tr>
<td>Disagree</td>
<td>514</td>
<td>525</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>485</td>
<td>505</td>
</tr>
</tbody>
</table>


As with interest and enjoyment results, further research into the differences between student dispositions pertaining to effort in mathematics between the two countries is necessary to better understand the disparity between positive dispositions and lower performance amongst Australian students. Further research would be needed to determine why students deemed investing effort into a subject “worth it”, as the reasons may vary between the countries or from student to student. Nonetheless, it is becoming increasingly
apparent that positive dispositions towards mathematics are not sufficient alone to improve student performance.

6.2.3.3 Effort in science (focus on PISA 2006)

Similar to the PISA 2003 survey, the Student Questionnaire for PISA 2006 asked students to indicate their opinions about making an effort in science on a scale of agreement. Results are shown in Figure 6.16. Overall, the most popular category in the Australian profile was ‘agree’. ‘Strongly agree’ and ‘disagree’ attracted similar median ratings and ‘strongly disagree’ was most unpopular. Combining the ‘strongly agree’ and ‘agree’ categories, the majority of Australians deemed effort in science ‘worth it’ (76.6%).

The Finnish profile was different somewhat with little popularity given to either of the ‘strongly’ categories. The Finnish students tended to prefer the median categories, ‘agree’ or ‘disagree’, with ‘agree’ proving the most popular. When combining the agree categories and the disagree categories Finnish students nominated their opinions at 52.5% and 46.5% respectively. In simple terms, only half of Finnish students deem effort in science as ‘worth it’. Chi-square testing yielded a significance result of $p<0.001$, therefore differences between results can be treated as significant.
Figure 6.16. Student ratings of agreement toward whether making an effort in science is ‘worth it’ for future work


Overall, there was a positive relationship between attitudes towards effort in science and student performance, as shown in Table 6.14. As per the usual trend, students in Finland significantly outperformed Australian students in all categories.
Table 6.14.

*Student mean performance parameters by agreement towards whether making an effort in science is “worth it” for future work*

<table>
<thead>
<tr>
<th></th>
<th>Australian students</th>
<th>Finnish students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science</td>
<td>Reading</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>577</td>
<td>555</td>
</tr>
<tr>
<td>Agree</td>
<td>529</td>
<td>511</td>
</tr>
<tr>
<td>Disagree</td>
<td>509</td>
<td>498</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>483</td>
<td>474</td>
</tr>
</tbody>
</table>


In this analysis of student effort in science the disparity between less positive student dispositions and higher performance parameters within the Finnish profile was revealed once again. Although over three-quarters of Australian students agreed that making an effort in science was ‘worth it’ (Figure 6.17) their performance parameters remained significantly behind those of Finnish students (Table 6.14).

6.3 Summary

This chapter has reported on the exploration of students’ dispositions towards learning and schoolwork in all three literacy domains across all three PISA data collection periods. From this a larger picture of students’ dispositions is apparent. Overall, it would seem that
when comparing the results from each country in terms of majorities and minorities, student’s personal dispositions were not as influential upon performance as was initially thought at the beginning of this project. Although positive personal dispositions were related to improved performance within each country profile, inter-country comparison did not confirm the same trend. Rather, Finnish student performance was consistently higher than that in Australia even though dispositions towards learning were not always more positive. Nevertheless, when the influences from home environments upon student dispositions were measured, as reported in the previous chapter, increased parental education and student-parent dialogue were both related to improved performance. Finnish students reported more frequent dialogue and a steeper increase in percentages of parents with tertiary education, which may contribute to the explanation of their superior performance.

Table 6.15 presents a summary of students’ dispositions towards learning and schoolwork, showing whether the majority of students in each country indicated positive or negative dispositions. If more than half of the sample from either country nominated positive responses to the PISA questions then that country has been allocated a + sign. If more than half of the sample from either country gave negative responses, then that country has been allocated a - sign. In regards to performance, the country with the higher performance has been allocated a ✓ ✓ ✓ ✓ symbol so that dispositions can be compared with performance.
Table 6.15.

Australian and Finnish students’ dispositions towards learning and schoolwork

<table>
<thead>
<tr>
<th>Positive Dispositions</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(more than half the sample positive)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aust</td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
<tr>
<td>The importance of doing well</td>
<td>+</td>
</tr>
</tbody>
</table>

Interest & enjoyment

2000
Reading is a favourite hobby | - | - | ✓ |

Maths is personally important | + | - |
Interested in mathematics | + | - | ✓ |

2003
Enjoyment of mathematics | - | - | ✓ |
Enjoy reading about mathematics | - | - | ✓ |

2006
Science is personally relevant | + | - | ✓ |
Science is valuable to society | + | + | ✓ |
Enjoy acquiring scientific knowledge | + | + | ✓ |
Interested in learning about science | + | + | ✓ |
Like to read about science | - | + | ✓ |
## Positive Dispositions

<table>
<thead>
<tr>
<th>Positive Dispositions</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(more than half the sample positive)</td>
<td></td>
</tr>
<tr>
<td>Aust students</td>
<td>Finnish students</td>
</tr>
<tr>
<td>Effort</td>
<td></td>
</tr>
<tr>
<td>2000 Best effort to acquire new knowledge and skills</td>
<td>+ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>2000 Like to work as hard as possible</td>
<td>+ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>2003 Making an effort in mathematics is worth it</td>
<td>+ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>2006 Making an effort in science is worth it</td>
<td>+ ✓ ✓ ✓ ✓</td>
</tr>
</tbody>
</table>

A thorough discussion of the results from this chapter follows in Chapter 7.

However, some concluding statements about the research results are briefly presented here.

From Table 6.15 it would seem that students in both countries demonstrative predominately positive dispositions towards investing effort into their schoolwork in all three data collection periods and in all literacy areas. In terms of agreeing to the importance of doing well, the Australian profile was somewhat more positive than the Finnish profile, even though Finnish students outperformed their Australian counterparts in all indicators except the personal importance of mathematics. This suggests then that there is a disparity amongst Australian students deeming achievement to be important and actually achieving higher results.

The 2006 data perhaps sheds some light on this disparity, showing that the majority of Australian students were generally more positive in their dispositions towards interest and
enjoyment of science except when it came to reading about science (Figure 6.12). On the other hand, the majority of Finnish students nominated positive responses towards reading about science but they were not so warm towards the personal relevance of science. These differences may be reflective of two different societies. Again, in mathematical literacy the Australian profile was somewhat more positive than the Finnish, yet Finnish students had the higher results. Academics have described the Finnish society as collectivist and consensus-based (Simola, 2005; Sahlberg, 2007) and with this view in mind Australian society would be more individualistic by comparison.

In the light that the above analysis showed positive relationships between improved attitudes and higher results within each country profile, it would seem that student dispositions alone do not explain the Finnish success. Further, it would appear that enthusiasm amongst Australian students alone is not sufficient to improve performance without other support from home and school environments. Moreover, consideration should also be given to supporting learning practices like reading. Literature presented in Chapter 2 showed strong relationships between reading as a learning practice and the influence of the home. Chapter 7 discusses these findings and considers the influence of the home upon student dispositions—namely parents’ education and frequency of student-parent dialogue—and the possible effects of these upon reading skills.
7.0 DISCUSSION

7.1 Introduction

This chapter synthesises the research findings from Chapters 5 and 6 with reference to the review of literature that took place in Chapters 2 and 3 and in doing so it presents some higher order themes, inferences and explanations, which moves this thesis towards its conclusion. It will be remembered that this study has focused on answering the research question: Are there differences between Australian and Finnish school students’ dispositions towards learning, and if so, are there links between differences in dispositions and known differences in performance? In the previous chapter it was found that indeed there are significant differences between the two countries in terms of student dispositions, and the findings regarding the links between dispositions and performance shed light upon the disparities between the two countries. In moving towards answering this research question as fully as possible, this chapter discusses in depth differences found by this study in student dispositions between the two countries and their links to performance. Chapter 8 then draws conclusions with specific reference to this project’s aims and makes recommendations for Australian education and further research. This discussion begins below by drawing conclusions about the models put to use in this project with reference to the research findings.
7.2 The research framework

In Chapter 2 this project initially adopted the Brickman and Miller (2001) model as the basis from which to review literature pertaining to student dispositions. This model is displayed again in Figure 7.1. The Brickman and Miller (2001) model illustrated the links between facets of student dispositions and student performance and the interrelated effects between these factors. The model also showed the influences of wider socio-cultural contexts such as home and school environments. Using this model as a framework, the review in Chapter 2 critiqued literature relating to the facets of student dispositions that affect performance and the influences of the home and school environments upon student dispositions. The following five facets of student dispositions were critiqued: personal values and perceived task value and importance; knowledge of possibilities and perception of obstacles; reading as a learning strategy; self-concept; self-efficacy; and motivation and movement towards personal future goals.
Figure 7.1. Brickman and Miller’s model for the impact of socio-cultural context on future goals and self-regulation

Although useful as a framework for the review, the Brickman and Miller (2001) model had limitations within the scope and aims of this project. It fell short at the need to identify operational indicators for measuring student dispositions; such indicators were needed to ascertain whether or not there are differences between Australian and Finnish students, and if so what these differences are, and whether they are linked to performance. Therefore, further critique of literature was undertaken and a new complementary model of student dispositions and their indicators, specific to this project, was tentatively proposed. This model, shown again in Figure 7.2, was developed from a collation of research literature findings that explained the connections between the facets of students’ dispositions and identified five operational indicators. Using the five indicators of student dispositions identified in the proposed model (Figure 7.2), careful selection of items from the PISA...
datasets that manifestly reflected the qualities of these indicators was performed and subsequent scientific analysis was carried out. Certainly, differences between Australian and Finnish students were found and these findings help to close some of the present gaps in literature concerning differences in dispositions towards learning between Australian and Finnish students and their links to performance.

*Figure 7.2. Student dispositions affecting performance and their indicators and influencing socio-cultural contexts*
Having put this model to use in the data analysis phase of this project in comparing Finnish and Australian students, this study found that the operational indicators did indeed successfully measure student dispositions. However, the research has also shown that when comparing the two countries dispositions did not always determine performance. Reasons for this observation are discussed below in Section 7.3. Therefore, a revised model has been developed in Figure 7.3 that omits the link between dispositions and performance. This study would argue the revised model shown in Figure 7.3 best reflects the findings of this study.

Figure 7.3. Operational indicators of student dispositions and the influences of their socio-cultural contexts used for comparing Australian and Finnish students
The findings from this study are considered below using the five indicators from the model in Figure 7.3: parental education levels and frequency of student-parent dialogue as indicators of influences of the home upon student dispositions; and student self-ratings of the importance of doing well; interest and enjoyment; and effort. These five indicators are grouped into two meta-categories: influences of the home upon student dispositions and students’ personal dispositions.

7.3 Differences in dispositions toward learning between Australian and Finnish students and links to performance

This section discusses the differences in student dispositions towards learning between Australian and Finnish students and is organised according to the five indicators of student dispositions shown in Figures 7.2 and 7.3 within the two meta-categories discussed above. The results chapter presented these findings within the contexts of reading, mathematics or science literacy areas as results were literacy area-specific. However, this discussion takes a more general view of results so that population generalisations can be surmised.

7.3.1 Influences of the home

As shown in the literature review, student dispositions are widely influenced by the socio-cultural context of the home (Datcher, 1982; Fay, 2001; Finn & Rock, 1997; Johnson et al., 2001; Ho & Willms, 1996; McInerney & McInerney, 2006; Voelkl, 1995). For the
purpose of this project, the indicators parental education levels and frequency of student-parent dialogue were used to measure these influences upon dispositions.

7.3.1.1 Parental education

Data analysis of parental education levels, the first indicator of student dispositions, revealed that in both countries higher levels of parental education were positively related to improved student performance levels, particularly in the categories of upper secondary schooling and theoretically-orientated tertiary education. This observation is reflective of the OECD’s (2001, 2004, 2007) discussions about the relationship between socio-economic status and student performance. It is also reflective of Bourdieu’s (1977, 1984) cultural reproduction theory, where he argued that cultural capital in the home positions a student for academic advantage or disadvantage. However, in general the performance parameters of students whose parents were vocationally tertiary educated and those who had no tertiary education were very similar in both countries. Moreover, students whose parents had no formal education often performed better than those whose parents had only primary schooling. Therefore, student performance does not necessarily improve directly with increased parental education in either Australia or Finland, until parents are highly educated, particularly tertiary educated. The strongest correlation between parental education levels and improved student performance was observed amongst the students whose parents were tertiary educated. This brings greater clarity to the evidence in the current literature that has been reviewed which suggests that parental education levels have strong influence over a student’s educational performance and dispositions towards learning (Demaray & Malecki, 2002; Demaray et al., 2005; Flouri et al., 2002, Gonzalez-DeHass et al., 2005; Marcon, 1999; Miedel & Reynolds, 1999; Paulson, 1994). In terms of inter-country differences
increasing percentages of parents are attaining tertiary education in both countries but the growth is steeper in Finland.

Another significant finding was that, although Finnish parents appeared to be more educated, the performance differences between students from more and less educated homes were narrower in the Finnish profile. Therefore, giving due consideration to these findings, it would seem that Finnish society (Sahlberg, 2007; Simola, 2005) or the Finnish schooling system (Välijärvi et al., 2002) better compensates for socio-economic difference than in Australia (OECD, 2007b). However, it may be that perhaps some further explanation lies within the influence of the home upon positive dispositions of Finnish students towards reading as an academic skill.

7.3.1.2 Frequency of student-parent discussion

The second indicator of student dispositions influenced by the home in this data analysis was the frequency of student-parent dialogue. In general, the results from this study showed a positive observable correlation between increased student-parent discussion and improved student performance in all literacy areas, but particularly in reading. Finnish students indicated that in general they talked more frequently with their parents than Australian students. When this statistical inference was coupled with the knowledge that Finnish students also performed more highly than Australian students, a strong relationship between dialogue and performance emerged. This research finding complemented other research such as that of Metcalfe and Game (2006) who explained that dialogue is vital to learning and highly influential upon academic success. Of the four types of discussion analysed in this study—general conversation, schoolwork, books, film and television, and
politics—Finnish students reported higher frequencies than their Australian contemporaries in three out of four categories. The one area of exception was that of politics. Considering this correlation between increased discussion and improved student performance and the observation that Finnish students talked more frequently and achieved more highly, there is a strong statistical inference that student-parent discussion is a significant factor in explaining the performance differences between the two countries. Student-parent dialogue was not much discussed in previous papers that have emerged from the PISA studies, but judging from the results of this study, further knowledge of its effects upon learning would be beneficial.

7.3.2 Students’ personal dispositions

Having considered the influences of home environments above, this section discusses students’ personal dispositions. It is at this point that some anomalies begin to emerge with regard to the relationships between dispositions and performance. Although within both the Australian and the Finnish country profiles correlations between positive dispositions and improved results were observed, when comparing the two countries the higher performance of Finnish students did not guarantee more positive dispositions. Discussion and explanations for this are outlined below and organised according to the three indicators of students’ personal dispositions.

7.3.2.1 Rating the importance of doing well

Student self-ratings of the importance of doing well at school gave the first indication that higher performance did not necessarily equate to more positive dispositions.
Looking within the Australian profile or within the Finnish profile the findings from this research suggested that there was a correlation between increased student ratings and improved performance in both countries. These findings supported part of the proposed model (Figure 7.2) developed by this study from literature that showed that the importance of doing well to be an indicator of a student’s value of an academic task and their desire to move toward achieving learning goals (Blumenfeld, 1992; Brickman & Miller, 2001; Harter, 2005; Sylva, 1994). However, the proposed model (Figure 7.2) became somewhat challenged when results were compared between the Australian and Finnish profiles and anomalies emerged from the research findings.

When country profiles were compared, regardless of the cultural or semantic differences, both countries had more than half of their participating students nominating some degree of importance in doing well in all literacy areas. However, the proportion of Australian students who responded positively to this indicator was considerably higher than Finnish students even though the Finnish had higher mean performance levels. This was the first indication of a surprising disparity between performance and dispositions between the two countries; that is, Australian students seemingly reported more positive dispositions but their performance was not so high. Comparatively, Finnish students reported less positive dispositions yet their performance was higher. These disparities stand out because the literature generally shows that positive dispositions are related to improved results, and it was on this basis that the proposed model (Figure 7.2) was developed. As a result of these anomalies, some modifications were made to the proposed model (Figure 7.2) and a revised model has been developed, shown in Figure 7.3.
It must be acknowledge that the OECD (2007) consistently reiterated that inter-country comparisons of this indicator are problematic due to cultural differences. As explained in the presentation of results in Chapters 5 and 6, in heeding this caution this study has forsaken specific nominal data and for the purposes of comparison views results in terms of majorities and minorities. Furthermore, similar patterns also emerged in the other indicators of students’ personal dispositions - interest, enjoyment and effort - supporting this observation about emerging disparities between dispositions and performance.

7.3.2.2 Interest and enjoyment in learning

Interest and enjoyment in learning as an indicator of student dispositions was quite revealing in terms of differences between Australian and Finnish students and seems to shed further light on the disparities discussed above, where positive dispositions do not result in higher performance. These findings were the second challenge to the literature-based model developed by this project (Figure 7.2) as current empirical literature would argue that positive ratings of interest and enjoyment as indicators of positive dispositions towards learning result in higher performance (Fay, 2001; Porter, 2007; Rutter, 1983). Once again, as the OECD (2001, 2004, 2007) cautioned against inter-country comparison of these indicators, results were viewed in terms of what the majority of students were indicating in either country, rather than as specific nominal data. As ratings of interest and enjoyment were specific to literacy areas, discussion below follows the chronological pattern of the PISA studies and the literacy areas of focus in each study.

Analysis of data regarding interest and enjoyment in reading, both as a PISA literacy area and as a cross-curricular skill, yielded some insightful results. Overall, students in both
countries did not give very positive indications about interest and enjoyment in reading literacy. Similarly, an overwhelming majority of students in both countries offered negative responses towards reading about mathematics. However, there were some significant differences in the profiles for reading about science and these offered some valuable insights as the majority of Finnish students indicated that they do like to read about science, but this was not the case for Australian students.

When considering student responses about interest and enjoyment in science the majority of Australian students deemed science personally relevant and important to society. Furthermore they indicated enjoyment towards acquiring new knowledge and interest in scientific topics. Nevertheless, it would seem that they did not like to read about science, nor did they perform better than their Finnish counterparts. On the other hand, the majority of Finnish students did not indicate that they considered science personally relevant but results showed that they deemed it valuable to society. This observation may be reflective of Simola’s (2005) claim about the collectivist mentality of the Finnish people. They also enjoyed acquiring new knowledge and were interested in scientific topics. But, as indicated above, the majority of Finnish students also liked to read about science and this was the biggest difference between the two countries’ profiles in terms of interest and enjoyment. This observation hints towards a correlation between interest in reading and higher performance in science. This finding complements the research reviewed in Chapter 2 that highlights the importance of reading as a factor in overcoming socio-economic disadvantage (OECD, 2002b; Guthrie & Wigfield, 2003) which may further explain the narrower performance gaps in the Finnish profile. Furthermore, statistical inferences suggest that interest in reading about science surpasses other areas of interest and enjoyment as a determinant of performance in science.
Furthermore, interest and enjoyment profiles in mathematical literacy were similar in terms of disparity between dispositions and performance. That is, although neither country reported positively about enjoyment of mathematics the majority of Australian students indicated that mathematics was personally important and that they had an interest in the subject. Notwithstanding this, while the majority of Finnish students indicated negative responses towards all mathematics interest and enjoyment indicators, they still outperformed Australian students in mathematics.

From these results, the dispositions reflected by the interest and enjoyment indicators do not readily explain the outstanding performance of Finnish students when compared with Australian students, as the original literature-based model (Figure 7.2) would suggest. It was only within the area of scientific literacy that interest and enjoyment in reading had a positive correlation with improved performance, and from this observation it is suggested that interest in reading amongst Finnish students in part explains their success.

7.3.2.3 Effort towards learning

This fifth and final indicator of student dispositions, effort towards learning, was the third indication that positive dispositions do not necessarily equate to improved performance when comparing Australian and Finnish students. Although the literature review showed positive links between interest and enjoyment, effort and student performance (Fay, 2001; Porter, 2005, 2007) this study did not find that effort, as a facet of student dispositions, was an explanation of the performance differences between Australian and Finnish 15-year-olds. The majority of students in both countries indicated that they invested effort into their studies in all three literacy areas, and the data analysis and research findings revealed that it
cannot be said that students in either country invested substantially more effort than the other. Therefore, this facet of student dispositions towards learning did not explain the higher performance of Finnish students, as it would seem that Australians also invested considerable effort, but were still not performing as highly.

Similar to the previous two indicators of students’ personal dispositions, within each of the country profiles increased effort resulted in higher performance. However, when comparison was made between Australian and Finnish students, high levels of effort did not necessitate high performance. Again, this showed an anomaly between student dispositions and performance, where positive personal dispositions did not necessarily equate to higher performance when comparing Australian and Finnish students.

7.4 Conclusion

Considering these findings about students’ personal dispositions, the data analysis phase of this study found the proposed model derived from literature (Figure 7.2), with links between student dispositions and performance, unsuitable for comparing dispositions between Australian and Finnish students. To this end, a revised model has been proposed by this project, as shown in Figure 7.3. This new model shows the links between student dispositions and their operational indicators, but does not illustrate a link between dispositions and performance. It is conceded that dispositions affect performance within each country, but when making comparison between the two countries the same pattern does not emerge. In light of these findings, conclusions are drawn and recommendations are made in Chapter 8.
8.0 CONCLUSION

Having presented a discussion of the research findings in the previous chapter, this final chapter draws conclusions with regard to the research question, the theoretical contention and aims of this project, and in closing makes a number of recommendations for further research and improving student performance in Australia. It will be remembered that the research question that underpinned this project read as follows: *Are there differences between Australian and Finnish school students’ dispositions towards learning, and if so, are there links between differences in dispositions and known differences in performance?*

Giving due consideration to the findings of this project it would appear that indeed there are differences in dispositions towards learning between Australian and Finnish students, including differences in the influences from the home environments between the two countries. However, as discussed in Chapter 7, when comparing the two countries dispositions did not necessarily determine performance in all areas. This study demonstrated that statistical links do exist between influences from the home upon student dispositions and student performance levels, both within and between the Australian and Finnish country profiles. However, in terms of students’ personal dispositions the effects of positive dispositions upon higher performance were observed within each of the country profiles, but positive dispositions did not always have a direct link with improved performance when making comparison between the two country profiles.
With reference to the theoretical contention of this project, that Finnish students have more positive dispositions towards learning than Australian students, all other things being equal, a number of disparities between dispositions and performance have been uncovered, as discussed in the previous chapter, and it has been found that overall the dispositions of Finnish students do not explain their academic success when compared with Australian students. It can be said that results from this study show that positive dispositions are related to improved performance within each of the countries. This confirms many of the findings noted in the review of literature in Chapter 2 and illustrated in the proposed model of indicators of student dispositions in Figure 7.2. However, data analysis results showed that the higher performance of Finnish students does not simply equate to positive dispositions amongst the majority of its students. Furthermore, although Australian students performed below their Finnish counterparts in the PISA tests, the dispositions of Australian students were not necessarily more negative by comparison. Certainly, in some instances Finnish students had more positive dispositions, but in other instances Australian student responses characterised more positive dispositions. However, in the vast majority of instances Finnish students outperformed Australian students. As a result, a revised model of operational indicators of student dispositions has been developed in Figure 7.3 that omits the premise that improved dispositions always lead to improved performance. Although positive dispositions are important they do not in themselves guarantee high performance. Therefore, this project concludes by stating that student dispositions alone do not explain the Finnish success, and that reasons behind their outstanding performances lie elsewhere.

Nevertheless, the study revealed that there are some dispositions that do have significant positive influences upon performance, namely student-parent dialogue and parental education levels. That is, students who came from homes where student-parent
dialogue was more frequent also performed more highly. Results from the data analysis showed that Finnish students conversed more frequently with their parents than Australian students. Therefore, there is strong statistical evidence to suggest that the more frequent student-parent dialogue evidenced in Finland may in part explain the higher performance of Finnish students. Similarly, although incremental parental education did not equate to incremental improved student performance, students who came from homes with tertiary-educated parents experienced higher performance levels than those from homes where parents were typified by lower levels of education. When comparing these trends between the two countries, analysis of data found that Finnish parents were becoming more educated at a faster rate than Australian parents. The statistical inferences drawn from the work contained in this paper suggest that these two influences from the home environments may have a combined effect upon the dispositions of Finnish students in terms of reading as an academic skill, as their interest in reading was higher than that reported by Australian students. It could be suggested that the home environments of Finnish students, where parents are more highly educated and student-parent dialogue is more frequent, encourage an interest in reading which in turn results in higher performance. This finding complements the research of Artelt et al. (2003) regarding lower interest in reading amongst students from lower SES homes, as mentioned in Section 2.4.1.2, p. 48.

Moreover, the narrower gap in Finnish performance appears to be the outcome of compensatory efforts to overcome SES difference within the country, whether by higher levels of parental education and student-parent dialogue (as found by this study), the education system (Välijärvi et al., 2002) or the nature of Finnish society (Sahlberg, 2007; Simola, 2005). These are all external factors affecting student performance; what Brickman and Miller (2001, p.121) would refer to as “past experiences in socio-cultural context.”
From the findings of this research, it would seem that external factors far outweigh the influence of internal factors, that is, students’ personal dispositions; notwithstanding the premise that external factors influence internal dispositions, as shown in Brickman and Miller’s (2001) model. Consequently, serious consideration must be given to the cultural capital in Finnish classroom and homes, as Finnish parents are increasingly more educated than their Australian counterparts, and Finnish teachers are also more highly educated. As discussed in the section below, further research in this area could better confirm the correlations between external and internal influences upon performance between Australia and Finland, as they are outside the research aims of this project.

At length it would appear that the research aims of this study have been met. This project has uncovered valuable insights into student dispositions towards learning amongst Australian and Finnish students, and it has reported the differences accordingly. Further, it has assessed the links between dispositions and performance, although the results were not as might have been expected. The recommendations below complete these aims by adding to the current body of knowledge information that has the potential to assist students to achieve improved results in education by identifying dispositions and associated learning practices in need of improvement in Australia.

8.1 Recommendations

Considering the research findings in Chapter 7 and the research conclusions that have been drawn above, two sets of recommendations are made below. The first
potential avenues for further research and the second makes suggestions for improving student performance in Australia.

8.1.1 Avenues for further research

Having satisfied the research question, concluding that differences in student dispositions between Australian and Finnish students do not explain differences in performance, it is a recommendation of this study that future research investigates differences between the two countries in terms of social capital in the school and home environments and the partnership between these two environments. It is possible that the combined strengths of higher parental education and frequent student-parent dialogue in Finnish homes advantages student learning, particularly reading. Considering the strength of Finnish students’ reading it is also recommended that the relationship between interest in reading and cultural capital in the home and schooling systems be further researched, giving attention to how the Finnish system compensates for SES disadvantage. Moreover, having found a link between increased student-parent dialogue and improved performance, further research could determine the reasons for more frequent dialogue in Finland and more thoroughly investigate the links between dialogue and performance. By and large, it would seem that the need to raise cultural capital in Australia is apparent, therefore suggestions for improving this situation are outlined below.

8.1.2 Suggestions for improving student performance in Australia

Following on from the recommendations above, it is a suggestion of this project that efforts be made to raise the cultural capital in Australian homes and schools. Within the
home context is it suggested that avenues be explored to foster more frequent student-parent dialogue. The quality of student-parent dialogue must also be considered, as the observation has been made that Finnish parents are becoming increasingly tertiary educated at a faster rate than is the case in Australia. This complements the Australian Parliamentary Library (2004) research findings from other OECD studies that showed the ‘investment in knowledge’ in Australian society was below the OECD average. As literature has already shown that SES, including parental education, affects language use in the home and student performance (Bourdieu, 1977; Bourdieu & Nice, 1984; Hart & Risely, 1995), it is a suggestion of this study that tertiary education be further encouraged in Australia, both for school leavers in the hope that future generations will have a greater likelihood of growing up in homes where parents are tertiary educated, and amongst current parents of school-aged children so that learning is modelled for current school students. Since this research was conducted the Australian government has adopted recommendations from the Bradley Review that confirms the critical state of tertiary education in Australia. In her review, Bradley (2008) reported that the Australian workforce was falling behind other nations in levels of tertiary education, with only 29% of people in the 25-34 age bracket possessing degree level qualifications. When compared to Australian students, the findings from this study showed that Finnish students are advantaged by way of having greater proportions of parents who are university educated.

Similarly, it is also a suggestion of this project that efforts be made to raise the overall cultural capital of schoolteachers in Australia by increased education. This is not to say that many individual teachers, and indeed many senior teachers, do not possess rich knowledge and understandings, however the adeptness of graduates and their ongoing
development must be considered. Further, in an effort to improve cultural capital in homes and schools, strong partnerships between teachers and parents must also be considered.

It is also a recommendation of this project that the importance of student interest and enjoyment in reading as a cross-curricular discipline be encouraged and further researched in Australia as an apparent means of improving student performance. The conclusions drawn above indicate that an interest in reading may surpass other interest and enjoyment factors affecting academic performance, particularly in science. It would seem that Finnish students are more positively disposed towards reading. When this observation is combined with the previous observation regarding supportive Finnish home environments, and the narrower performance gaps amongst Finnish students as a result of better compensation for SES difference, it is suggested that there is a positive correlation between Finnish dispositions towards reading, the known advantage of reading in overcoming SES disadvantage (OECD, 2002b; Guthrie & Wigfield, 2003), and the outstanding academic performances of Finnish students.

In conclusion, this study highlights the crucial importance of cultural capital in the home and school environments. As discussed above, statistical analysis conducted by this study showed strong correlations between cultural capital in the home and student performance. However, it was also shown that students’ personal dispositions towards learning can be surpassed by more influential factors affecting student performance. This observation led to the consideration of the importance of cultural capital in the school environment also. In Finland it would seem that a collectivist systemic approach to education does not identify factors like SES or students’ personal dispositions as excuses for
underperformance. Although the effects of SES upon student performance are
acknowledged by this study, the Finnish example shows that when students are provided
with opportunities and interventions the disadvantages related to SES can be overcome.
Furthermore, this study found cultural capital in the Finnish classroom in the form of teacher
training and other professional support to be more influential upon student performance than
the personal dispositions of students. To this end, efforts to raise the cultural capital of
Australian homes and schools, as recommended above, would better position our young
people for academic success.
References


Appendix

Melbourne Declaration on National Goals for Schooling for Young Australians