

# **Educational Decentralization and Student Achievement**

*A Comparative Study Utilizing Data from PISA to Investigate a Potential Relationship between School Autonomy and Student Performance in Australia, Canada, Finland, Norway and Sweden*

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## Abstract

The purpose of this thesis is to explore whether decentralization of education systems affects student performance. Many countries around the world have adopted similar educational policies since the 1980s, including the introduction of decentralization with a shift in decision-making power from central authority to local authority and in some cases to the schools themselves. There is a common view among many policymakers that one way of obtaining high quality education is through decentralization policies, a view encouraged by OECD (Organisation for Economic Co-operation and Development).

Five countries, Australia, Canada, Finland, Sweden and Norway, are studied and compared by looking at the influence of decentralization in their educational reforms, at which level the decision-making power is situated, and how this correlates with the achievement of their students. The approach preferred is a quantitative comparative method, and already existing data from the PISA 2006 survey is utilized. 1806 schools participate from the five countries, each school representing one case. In the PISA survey, principals at sampled schools answer a questionnaire concerning their school's decision-making power regarding hiring/firing teachers, budget allocation and curriculum matters. A limitation to the study is that this information is provided by only one person, the school's principal. Nevertheless, the responses are employed in the study indicating the school's autonomy level, while the students' science score in PISA represents student achievement. Family background is a factor proven to influence student performance, and this is controlled for by utilize data on both socio-economic status and immigrant background provided by PISA.

The findings implicate that the level of school autonomy has very little influence on student performance. In the countries expressing a significant correlation between school autonomy and student performance, mainly Australia and Canada, the effect disappears when controlling for socio-economic status. This result is not consistent with the suggestion of decentralizing education system as a way to increase student performance.

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## Abbreviations

|                  |   |
|------------------|---|
| ACER             | Australian Council for Educational Research   |
| <i>Autemploy</i> | Construct for Hiring and Firing of Teachers, Establishing Teachers Salary and Determining Salary Increases. |
| <i>Autlearn</i>  | Construct for Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered.         |
| CITO             | National Institute for Educational Measurement, Netherlands   |
| CMEC             | Council of Ministers of Education Canada  |
| DEEWR            | Department of Education, Employment and Workplace Relation, Australia                                       |
| DEST             | Department of Education, Science and Training, Australia  |
| ESCS             | Economic, Social and Cultural Status  |
| ETS              | Educational Testing Service, USA  |
| FNBE             | Finnish National Board of Education   |
| ICT              | Information and Communications Technology   |
| IIEP             | International Institute for Educational Planning  |
| MCEETYA          | Ministerial Council on Education, Employment, Training and Youth Affairs, Australia                         |
| NIER             | National Institute for Educational Policy Research, Japan   |
| NQAS             | National Quality Assessment System, Norway  |
| OECD             | Organisation for Economic Co-operation and Development.   |
| PISA             | Programme for International Student Assessment  |
| PCEIP            | Pan-Canadian Education Indicators Program   |
| PCAP             | Pan-Canadian Assessment Program   |
| PISA             | Programme for International Student Assessment  |
| SBM              | School Based Management   |
| SD               | Standard Deviation  |
| SNAE             | Swedish National Agency for Education   |
| TIMSS            | Trends in International Mathematics and Science Study   |
| UNESCO           | United Nations Educational, Scientific and Cultural Organization  |

# 1. Introduction

## 1.1 Background Information for the Study

There has been a global trend of decentralizing education systems over the last couple of decades. Most countries are experimenting with or considering some form of educational decentralization which implies delegation of power and authority from the central government to the regional or local levels, or to schools (Winkler 1993, Karlsen 2000, Maslowski et al. 2007). The policies and practises for implementing decentralization reforms vary widely across countries, and also within countries, in terms of how much authority is allocated and to which level in the system it is delegated (Winkler 1993). Centralization and decentralization are not "either-or" conditions, and in many countries a balance between the two is found (CIESIN 2009).

Decentralization policies were introduced in the 1970s, and there has been different ideologies supporting these policies. The main focus in the beginning was democratic participation, followed by rationalization and efficiency arguments, and for some countries a need to restore the legitimacy of politics and governmental institutions by redistributing power (Karlsen 2000, Maslowski et al. 2007). There are manifold motives and incentives among countries for educational decentralization, but the rationale behind many of these motives is the assumption that increased local autonomy will enhance the quality of education and result in higher student achievement (OECD 2005a). A belief is that part of the quality issue is the efficient and effective use of limited resources. The advocates of decentralization claim that when decision-making authority is brought to the local level, the system becomes more flexible and efficient. Efficiency can be seen as the maximization of results within the limit of available resources, and since the local level is familiar with local condition, a better allocation of scarce resources can take place (Belfield and Levin 2002). Effectiveness can be understood as the production of learning, while quality of education relates to the realised level of student performance, and to the educational processes through which it is claimed that quality is achieved (Bottani 2000, Maslowski et al. 2007). The effectiveness and quality of education are often measured in achievement tests, and when the

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local level get more autonomy, teachers and school administration are made more directly responsible for students' achievement. Winkler (1993) argues that many proponents of decentralization assume that its benefits derive largely from the accountability pressure it produces. There are also those who encourage market mechanism and believe that good quality and efficient use of resources are best achieved by competition between schools. Schools that are doing well will stay in the market, while those not so successful will either improve or go out of business (Lauglo 1995).

In today's globalized world, where the countries want to participate and compete on the world market, there is a pressure to increase the average level of education in the labor force. Two of the main features of globalization are information and innovation, and they, in turn, are highly knowledge intensive. Knowledge is regarded as the new economy in the global world, and quality education is seen as the answer to improve the average level of knowledge and competency in the population (Castells 1996). The Organisation of Economic Co-operation and Development (OECD) states that introduction of educational reforms emphasizing decentralization is a preferable strategy to achieve high quality education (Gurría 2007a), and several countries have followed this strategy and implemented educational reforms accentuating decentralization. Policymakers and analysts are encouraged by globalization to review the performance of educational systems worldwide, and OECD has developed devices to help policymakers to measure educational outcomes and judge performance in comparison to other countries. One of these devices is the Programme for International Student Assessment, PISA, an international study on how well prepared 15-year-old students are to meet the challenges of today's knowledge societies.

This study is largely based on data from the PISA 2006 survey. Even though there are many different opinions regarding the PISA survey, the survey itself will not be debated here, I simply take advantage of the enormous amount of information PISA offers, and utilize the data necessary for my study. Five countries; Australia, Canada, Finland, Sweden and Norway, are studied and compared by looking at the influence of decentralization in their educational reforms, at which level the decision-making power is situated, and how this correlates with the achievement of their students. Family background is a factor proven to influence student performance (OECD 2006), and this is controlled for by employing data on both socio-economic status and immigrant background provided by PISA. Norway is an

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obvious choice for this study since I want to compare the education system and student performance in my home country with other countries of interest. I found it natural to include two neighbouring countries, Sweden and Finland, both socialistic and wealthy countries like Norway, and the three also share a history of similar policies. Alongside the Nordic countries, Australia and Canada are included, two countries consisting of autonomous regions with independent education policies. The Nordic countries have a history of a centralized strong nation state while Australia and Canada are federal states with a more decentralized and weak nation state. However, there are some similarities between the five countries which make them suitable for comparison. All are OECD members and wealthy states with an emphasis on quality education, in addition the database from PISA 2006 reveals that all five countries express big between-school differences regarding the level of local autonomy, and they all have low influence from socio-economic status compared to the OECD-mean (OECD 2007b).

## 1.2 Research Objectives

With all the arguments supporting decentralization as a quality booster for education, my hypothesis emerges as “*Educational Decentralization Improves Student Achievement*”. The main research question that follows is “*Does the transition of educational authority from central to local level affects student achievement?*” I will examine if there exists a relationship between the level of local autonomy and students’ school achievement, and if it does, I will measure the strength of the relationship. Local autonomy refers to the decision-making power held by the principal and teachers and/or the school governing board regarding teacher employment and student learning. As a measure for student achievement, Science score from the PISA 2006 survey is employed (see Chapter 1.3). The causal nature of the relationship cannot be established, but it is still possible to compare educational policies and practices to student performance (OECD 2007b).

Educational achievement in general cannot be understood in terms of simple relationships between single variables (Lie and Roe 2003). Movement of authority within the educational organization is only one of many factors that might have an influence on student achievement. Previous research has shown that the most influential factor on how well

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student perform is the student home background (Bourdieu & Passeron 1990, Coleman 1988, Ho & Willms 1996, OECD 2006). Thus, my second research question is “*Does a potential relationship between local autonomy and student achievement still exist after controlling for socio-economic status and immigrant background?*”

### 1.3 Methodology

I will examine if my hypothesis suggesting that ‘local autonomy within schools is positively associated with better student achievement’ is supported by empirical data. In my search for the alleged relationship, I utilize existing data from the PISA 2006 survey. PISA is a triennial assessment measuring 15 year old students’ achievement in reading, math and science. The main focus in PISA 2006 was on science, hence the students’ science score is employed as a measure for student achievement (Appendix A). In the forthcoming analyses all the participating students are treated as one group regardless of gender, type of school (public or private), type of education (academic or vocational) or assessment language if the assessment are offered in several languages within a country. The principal at the schools sampled to participate in PISA answers a set of questions to disclose information concerning their school’s decision-making power regarding hiring/firing teachers, budget allocation and curriculum matters (Appendix B). The response given by the principal represents the school’s level of autonomy. Participating students answer a context questionnaire, providing information on their family background. These responses are applied when controlling for socio-economic status and immigrant background in the relationship analyses.

The approach preferred is a quantitative comparative method, and the statistical computer program SPSS is utilized as a tool for the analyses. 1806 schools from the five countries in this study participated in the PISA 2006 study, each school representing one case. Both within-country differences as well as between-country differences regarding student performance and level of local autonomy are examined. The countries are compared through the average score of all the sampled schools within the country, while between-school differences within a country are observed through the variance in the science score and autonomy level. Correlation and multiple regression analyses are employed to test whether

the level of local autonomy affects student achievement, with and without controlling for family background.

A limitation to the study is that the information on the school's level of autonomy is based on the perception of only one person, the school's principal. This brings about some ambiguity with reference to the credibility of the answers. Another issue is the big difference in number of schools participating for each country. In my study Canada is represented by 896 schools, Finland only by 155, and when performing relationship analyses a very weak correlations can be found to be statistically significant in a large sample size, and vice versa; a small sample size need a strong relationship between the variables to get a statistical significant result.

## 1.4 Structure of the thesis

The thesis starts with a theory part to provide some insight to the main concepts that relate to my study. The theory part consists of three chapters, because there are three main aspects of the study; the concept of decentralization and the impact of globalization on educational reforms; the PISA study; and the educational system in the five countries compared. The three parts are connected and influence each other, but the division makes a more structured presentation of the topic. In Chapter 2, different arguments for decentralization policies are illuminated, as well as the influence globalization implement on the education system. Since the thesis is largely based on data from the PISA 2006 survey, Chapter 3 involves features of PISA accompanied by a description on how the data are sampled, collected and assessed. In the last chapter of the theory part, the five countries in my study; Australia, Canada, Finland, Norway and Sweden, are presented. Their educational system, policies and reforms are discussed alongside the context in which the educational system works. The following methodology chapter deals with data from the PISA 2006 survey that I make use of in my analyses, together with a description of the methods employed in the search for a possible relationship between school autonomy and student performance. In the subsequent chapter the actual analyses take place, including a description of the results for each of the analyses. The first part of this chapter is mainly committed to the creation of constructs for school autonomy and the discussion of which constructs to employ in forthcoming analyses, while

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the hypothesis is tested in the second part. Chapter 7 is the discussion chapter, in which the results from the analyses are reflected upon and discussed in relation to decentralization policies and the countries' educational systems. This leads to a conclusion on whether my hypothesis claiming a positive relationship between educational decentralization and school achievement can be accepted or not. Chapter 8 wraps up the study with a summary and some concluding remarks.

## **2. Educational Decentralization in a Globalized World**

Many countries have implemented new educational reforms over the last 20 years, and the reform trends are similar across countries. The forces of globalization have been held responsible for the convergence of educational policies in a world where knowledge is regarded as the new economy. A highly educated workforce is necessary for countries to be able to compete on the world market, and quality education is seen as the answer to increase the average level of knowledge in the population (Castells 1996, Crossley and Watson 2003). According to the Organisation of Economic Co-operation and Development (OECD), a preferable strategy to achieve high quality education is to implement reforms emphasizing educational decentralization (Gurría 2007b).

In this chapter, the concept of decentralization is explored alongside the role and impact of decentralization as part of educational reforms in a globalized world. The first part describes features of decentralization while the second part deals with globalization and its impact on educational reforms.

### **2.1 Decentralization**

#### **2.1.1 The Concept of Decentralization**

Decentralization is a highly imprecise notion that cannot be defined as one point or one location. A centre can be defined precisely, a point in the midst between the most and the least, or furthest away from all boundaries. Decentralization usually refers to a movement from the centre to the periphery (Lauglo 1995, Karlsen 2000). The concept itself does not give any information about the strength of the movement or about what is really moved. When it comes to distribution of authority within an organization, such as the national education system, centre mainly refers to the top in a hierarchical authority structure (Lauglo 1995). In most cases the concept of decentralization will be attached to some kind of distribution of power and authority, but there are different understandings of decentralization



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and local management in different countries which leads to a wide range of decentralization systems (Karlsen 2000). Centralization and decentralization are not "either-or" conditions, and in many countries a balance between the two is found (CIESIN 2009).

Decentralization is hard to define because there are many different alternatives to concentrating authority and among the strategies connected to decentralization there are deconcentration, delegation and devolution. The different forms are not mutually exclusive, they all have characteristics of different types influenced by one another (Lauglo 1995, Bray 2003).

### 2.1.2 Deconcentration, Delegation and Devolution

Deconcentration means that the ministry is in power and spread their ministry officials to regional and local level where they are in charge of ministry affairs. The authority and decision-making can be delegated for a period of time, but the ministry is able to intervene. Deconcentration is often considered to be the weakest form of decentralization, and according to Winkler (1993), this is not real decentralization. Even if it is usually described as a form of decentralization, deconcentration can be a mechanism for tightening central control of the periphery. When staff is posted to control that central government policies are implemented in stead of allowing greater local decision-making (Bray 2003).

Decentralization as delegation normally means that local officials have administrative responsibilities and execute the tasks typically defined by central authorities. Central government transfers responsibility for decision-making and administration of public functions, such as education, to organizations not totally controlled by the central government, but ultimately accountable to it. This is a more extensive form of decentralization, and delegation might also means real autonomy to the local level when total central control is difficult (CIESIN 2009).

The third type of decentralization is devolution. Devolution is characterized by the transfer of decision-making authority, responsibility and financial resources from central government level to legally incorporated local governments, such as states, provinces, districts or

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municipalities. The local level authority has legally recognized geographical boundaries in which they hold authority and wherein they execute their public responsibilities. The local bodies are bound to national policies, and are to varying degree dependent on central government for financial resources and planning guidelines (CIESIN 2009). Devolution is the type of decentralization that underlies most political decentralization, in the meaning of sub-national jurisdictions have independent revenue sources and their leadership is locally elected. Karlsen (2000) argues that the only category to be called decentralization is devolution where decision-making powers and resources are transmitted from central to local level, and the local authority and autonomy are clearly increased.

## 2.2 Towards a Decentralized Education System

The educational systems all over the world expanded massively after World War II, and for a period central policy-making became important as part of nation-building strategy (Lauglo 1995). In the 1970s educational policy shifted towards decentralization, and there have been different arguments supporting decentralization policies from this time towards the end of the millennium (Karlsen 2000). The most important arguments in the 1970s were democracy and establishment of democratic institutions for participation and decision-making. In the late 1980s and throughout the 1990s decentralization was seen as a governance strategy for rationalization and efficiency. Decentralization was expected to generate revenues for the education system by taking advantage of local sources of taxation and by reducing expenditure. The reasons for educational decentralization are manifold, and often vary across countries. In a number of countries that were engaged in widespread decentralization efforts during the 1980s, the incentive to decentralize decision-making powers was primarily based on financial motives (Maslowski et al. 2007). The advocates were convinced that the local level held the competence needed to use existing funding in a more flexible and efficient way, and the local level bodies were held accountable for the resources and the efficiency. This is a more market oriented way of looking at decentralization, more autonomy at the local level, focusing on individual rights and free choice (Karlsen 2000). Other motives, particularly during the 1990s, derived from the need to restore the legitimacy of politics and governmental institutions by redistributing power and by allowing parents

and other local stakeholders to participate in decisions taken in schools (Maslowski et al. 2007).

There are different interpretations of decentralization in relation to community participation and handing over authority to the local level. In one end there are those with faith in a government's good intentions for individual choice and local autonomy, in the other those who believe that governments are driven by self interest and seek to shift the spending and responsibility from central to local level. In so doing, the governments avoid the blame for social problems which they fail to improve (Lauglo 1995). Anyhow, it is worth noticing that decentralization models are usually initiated from the top by the authorities at the central level, and not by pressure and action from the lower levels (Karlsen 2000, McGinn 1997, Bray 2003). Practicalities are also of importance when the motives for decentralization are discussed. Regarding educational decentralization the heterogeneity of the student mass, problems of communication between local level and distant central level, the financial burden of the central government, and the expansion of the educational system are all reasons for implementing decentralization policies (Lauglo 1995).

## 2.3 Decentralization as Part of Educational Reforms

### 2.3.1 Objectives for Educational Decentralization

Many countries have implemented educational reforms since 1980. The reform trends are similar across countries, and the main purpose of the new reforms has mainly been decentralization of authority from central to local level (Bottani 2000). According to Winkler (1993) there are four main arguments supporting decentralization policies, and these arguments may also explain the popularity decentralization has gained around the world. The four arguments consist of the financial argument, the efficiency rationale, the accountability and effectiveness rationale and the redistribution of political power. Apart from these various incentives to engage in decentralization efforts, educational decentralization is also introduced, or at least legitimated by the ambition to enhance the quality of education (Maslowski et al. 2007). There are numerous ways to combine different

degrees of autonomy, participation and accountability to create a reform, but each variant has to fit the particular culture and politics of the country in question. The ultimate hope is that by giving decision-making power to the people close to the core of the service, the efficiency will increase and the quality of the service will improve (World Bank 2007).

The next subchapters elaborates the arguments supporting decentralization, starting with Winkler's four main arguments, followed by a paragraph discussing quality and equality in education and ending with a description of school based management and use of the market mechanism.

### 2.3.2 The Financial Argument

The financial argument is that decentralization makes education more efficient and gives more in return for the investment. This argument came about when the increased enrolment rate in primary and secondary schools after the Second World War amplified the educational expenditures. Winkler (1993) argues that the growing educational expenditures make a shift of burden to lower levels in the educational system more and more appealing for central governments. By shifting decision-making to lower levels, the central administration is able to transfer the responsibility for reduced spending and difficult decisions to the local level. To ask those being cut to cut themselves, is an effective way to reduce spending, says Rinne and co-workers (2002). Even if there are various reasons for decentralization, Maslowski et al. (2007) believe the incentive for most countries is based on financial motives, and according to Bray (2003), the financial hardship that many governments experience during the 1980s and 1990s greatly increased the interest of community financing. Bray calls it a negative motive for decentralization if the reason for introducing this policy is that the centre wants to reduce its responsibility for education as a result of financial constraints.

### 2.3.3 The Efficiency Rationale

The efficiency rationale advocates that centralized planning and administration are both expensive and gives low quality education. The costs are high when every minor decision has to be decided by a geographically and culturally distant bureaucracy (Winkler 1993). A

decentralized system on the other hand, is flexible and can meet demands from students and parents more efficiently because decisions are made at the local level. Hence, the main assumption is that decentralization is smart and that centralized systems are bureaucratic and expensive. Decentralization is said to yield considerable efficiency in the management of educational systems. There are two sets of expectations regarding this claim; the first one addresses how to raise resources and the second one how the resources are used. The first expectation is that decentralization will mobilize and generate untapped local and regional resources that are not available under more centralized conditions. The second expectation is that these resources will be more efficiently used in a decentralized system. This is based on the assumption that the decision makers know the local conditions which in turn will lead to a better match between demand and supply and a better allocation of scarce resources (Weiler 1993).

A number of decentralization measures concern efficiency goals, but there are found very little empirical evidence about whether decentralization policies in fact serve the goals which their advocates use as rationales for these policies. Winkler (1993) believes much will depend on the specifics of policies and on the context in which policies are introduced. Weak administrative or technical capacity at local levels may result in services being delivered less efficiently and effectively in some areas of the country.

#### 2.3.4 The Effectiveness and Accountability Rationale

The effectiveness rationale holds that the production of learning will increase and the educational results will improve when more decisions are taken closer to the school level. Teachers and school administration are made more directly responsible for student's achievement if schools get more autonomy, and the schools become more accountable to parents, students and the local community (Winkler 1993, Carnoy and Rhoten 2002). Winkler (1993) states that most arguments for decentralization assume that its benefits derive largely from the nature of the accountability pressure it produces.

Effectiveness, understood as the production of learning, is often measured through scores in achievement tests like the PISA survey. This is an assessment of all involved in the learning

process; teachers, curriculum, materials, administration and facilities. An assessment like this is supposed to help the policymakers to improve the quality of education. In almost every country there is a tough fight for public finance which raises serious questions about the state's continued capacity to finance and provide quality based education. Cost effectiveness measures are sought, like competition between institutions, leaving more scope for private provisions and more responsibility to local governments (Winkler 1993, Lauglo 1995). Some countries implement school-based management (see Chapter 2.3.7) to increase the effectiveness, the argument is that the teachers and the principals should be given more control since learning takes place at schools, in the classrooms (McGinn 1997). Simultaneously there have been frequent examples of strengthening the influence of the central authority through increased control of output and by national curriculum frameworks. The centre calls for increased accountability, consistency, high standards and national competitiveness (Bottani 2000).

### 2.3.5 The Redistribution of Political Power

To some people the primary object of decentralization is the redistribution of political power (Lauglo 1995). This type of decentralization is more concerned with transfer of authority from one group to another than with authority distribution from one level to another. Decentralization is seen as a democratization process which makes people more involved in decision-making and empowers groups in the society.

The state has a dual interest in exercising its political power; maintaining control on the one hand and sustaining its legitimacy on the other (Weiler 1993, Winkler 1993). These two interests are contradictory, and there is a persistent tension between them. Centralization promotes control while decentralization promotes legitimacy. Control is usually obtained through centralized set standards implemented as curricular prescriptions, examination requirements and accreditation rules. The state also maintains control by exercising its authority over the allocation of resources. This is supposed to enhance equity by eliminating disparities in terms of resources and to increase effectiveness by allowing greater movement of resources to where they are most needed (Weiler 1993). Legitimacy on the other hand is restored by redistributing power and allowing parents and other local stakeholders to

participate in decisions taken in schools. The belief is that more power will lead to an increased commitment of local actors and that educational innovations will be stimulated (Maslowski et al. 2007). Weiler (1993) believes the states interest in control is likely to limit the extent of any real decentralization, and McGinn (1997) says that decentralization may increase participation, but argues that this is just in decisions of lesser importance. Also, when satisfying the interests of some groups, he continues, evidence suggests that education is made less relevant for a larger proportion.

### 2.3.6 Quality and Equality in Education

Educational decentralization is also introduced or at least legitimated by the ambition to enhance the quality of education (Maslowski et al. 2007). There is a belief that part of the quality issue is the efficient and effective use of limited resources. This has led several countries to decentralize educational administration to the local level based on the argument that this will lead to efficiency with more flexibility and better allocation of limited resources, effectiveness and finally improved quality of the whole education process. McGinn (1997) argues that closeness to problems does not necessarily means capacity to solve them, and Watson and co-workers (1997) see this as a backdoor way of encouraging, or maybe forcing, local communities to contribute financially to education. Improvement of quality in the educational system is not measured in terms of local autonomy, but in terms of outcome, they say, and call for improvement of academic standards, extension of standardized tests, and criteria for a quality audit of both individuals and institutions.

Quality and equality are often competing forces in the effective and efficient education system. In the centralized model, unequal educational opportunities are the results of decisions made in the ministry regarding resource allocation, while in the decentralized model, unequal educational opportunities are usually the result of differences in wealth or tax bases among local governments responsible for financing education. If there is a high correlation between educational quality/quantity and high income, there is a low equality in educational opportunity (Winkler 1993). Decentralization is likely to permit and perhaps encourage social inequalities since equality is expensive, and absence of strong central government policies may contribute to spending differences. To avoid inequalities, Fiske

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(1996) suggests that a goal of the decentralization should be to narrow the gaps, which will require the central/regional government to take compensatory steps such as special grants to low-performing schools.

### 2.3.7 School Based Management

A complete educational decentralization is when the decision-making authority is moved from national or regional authorities to school level actors. This is called School Based Management (SBM), and the core feature of SBM is to give those who work in a school greater control of their school (Cook 2007). Still, the government always has some role in education, and this role can affect how a school envisions SBM activities, and how the school implements these activities. SBM requires a new kind of leadership, and school leaders and teachers need to be able to deal with control, independence and collaboration. Thus, professional development for teachers and administrators is very important in order for sustained and effective SBM, additionally a strong accountability system needs to be established (World Bank 2007). According to Cook (2007), SBM does not include local control by elected or appointed school boards; SBM initially concerns decisions that are made, implemented and monitored within the school by its own professional staff. Parents and community members have roles to play in SBM, but these roles are not universally clear and are not always essential. Leithwood and Menzies (1998) argue that there are four different models of SBM characterized by those involved in decision-making; administrative control where principal dominates; professional control in which teachers dominate; community control where parents/communities dominate and balanced control with shared decision-making between parents and professionals. A school might fundamentally change all its administrative, pedagogical and external relations functions, or just some of them. The decision-making power may stay with the principal, or be shared just with teachers, or shared with teachers, parents and other community representatives (Leithwood and Menzies 1998). The various combinations of to whom the decision-making authority is devolved, and the degree of autonomy that is devolved, make almost every SBM reform unique, and SBM reforms around the world are inevitably different from each other. The diverse context surrounding SBM also increases the heterogeneity between schools in the country (Cook 2007).



There is a lack of strong theoretical argument and empirical evidence to show that SBM improves the quality of teaching (Leithwood and Menzies 1998), and there is little research addressing how SBM directly impacts student achievement. Fiske (2000) believes there are limits to what administrative decentralization can attain, because there is no reason to presume that a redesigned educational system by itself will lead to either efficiency or to better teaching and learning.

### 2.3.8 Market Mechanism

Use of the market mechanism is also a form of decentralization. It is justified by the request to improve efficiency, and to serve the liberal value of freedom for individuals to make their own choices and decisions. Competition is a key word, and those who encourage market mechanism believe that good quality and efficient use of resources are best achieved by competition (Lauglo 1995). The assumption is that customers, meaning the students and their parents, are the best to judge the value of services rendered, and they should be given choice among competing institutions (in areas where there are more than one institution). Schools are being regarded as business organizations competing against one another for customers and clients, students and parents. Scoppio (2002) calls this marketization of education, and argues that education is made into a commodity. Advocates of market mechanism believe that competition for customers will make efficient institutions successful and those not so promising will either improve or go out of business (Lauglo 1995). The role of the government is to lay down certain standards and to accredit and monitor institutions to assure a certain level of quality to the customers. Hannaway and Carnoy (1993b) believe that reformers push for choice and free market to improve efficiency, while they at the same time want centrally controlled national examination to make sure that the centrally determined educational norms are achieved.

There are different ways of funding the marketization of education. The customers may pay for all the services received; privatization of education, or it could be a public offer where the funding for students can be tied to enrolment rate and successful completion of courses (Lauglo 1995). It might also be a combination of these two when the customers pay tuition fees covering part of the cost. Another option for financing the education is to introduce

voucher programs. A voucher is a payment that a public body or a private organization gives directly to students and parents to be used at the school of their choice. The value of the voucher is equal, or often somewhat less, than per student government expenditure in public schools (Patrinos and Ariasingam 1997). Parents who are not satisfied with the education their children receive at school, can take the financial assistance they are given, transfer their children to another school, public or private, and the voucher enables the parent to pay for most of any tuition charged (Coulson 1998). In this way competition is introduced to the public system.

The tensions between egalitarian goals and decentralization policies are present when market mechanisms are in use. The proponents argue that parental choice and competition will improve education for all children by making the education system more efficient, improve quality, increase access, and enhance equity. Critics towards market mechanism argue that there is unequal purchasing power among the customers and that schools compete to attract the most able students and avoid enrolling the less motivated and less able. This might lead to increased social class inequality in education and also inequality of opportunity between high- and low achieving students (Belfield and Levin 2002).

## 2.4 Globalization and Educational Reforms

### 2.4.1 Globalization

Globalization has become a buzzword, and those using the term often have contrasting understandings of what it means. For many globalization is characterized by neo-liberal policies which call for a global free market for goods and services and reduced role of the state. Scholte (2000) argues that globalization is much more than liberalization of markets and internationalization. Globalization involves the diffusion of ideas, practices and technologies, and social space is no longer mapped in terms of territorial places, distances or borders. Supraterritorial or transworld relations between people emerge, which in turn leads to powerful economic, political, cultural and social dimensions. Giddens (1990: 64) has described globalization as “the intensification of worldwide social relations which link

distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa". This involves a change in the way we understand geography and experience localness. Castells (1996) highlights the role of the information technology which has led to a compressed view of space and time in the globalized world. The national borders are no longer a limit for competition, and companies in one country may very well move their factories to countries where production is cheaper. Time differences do not exist in the global economy, and information is communicated as it is produced. Information and innovation are two of the main bases of globalization, according to Castells (1996), and they, in turn, are highly knowledge intensive. Information can be seen as raw material to produce knowledge, and those who have the power of knowledge control the market. Crossley and Watson (2003) support this and find the massive worldwide movement of capital that depends on information, communication and knowledge to be key features of globalization. They also see competition as an important aspect of globalization and believe that all from individuals to countries are competing, now more than ever.

Castells (1996) argues that productivity and competitiveness are a function of knowledge generation and information processing. In this knowledge based economy the power lies in the ability to generate new ideas and turn them into products and services which consumers want (Leadbeater 2000). This calls for flexible workers that are able to change the kind of jobs they do over their work lives and manage multitasked jobs. In order to meet these demands, there is a pressure to increase the average level of education in the labor force. Quality education is seen as the answer to the development of higher problem-solving skills and flexibility in knowing how to perform tasks necessary in the new information economy, and globalization encourages policymakers and analysts to review the performance of educational systems worldwide (Carnoy 1999). Education is expensive, and when the demands for more education rise, there will also be a discussion about who should pay the bill; the nation, the companies or the individuals themselves. Yet another issue is how to make education fair and give everybody the same educational opportunities regardless of their home background, ethnicity, gender and geographical locations. Carnoy (1999) implies that globalization has initiated three kinds of responses in the area of education; competitiveness-, finance- and equity driven reforms. The competitiveness driven reforms are first and foremost an attempt to improve economic productivity. The main concern for

the finance driven reforms is how to pay for the education, and the equity driven ones want to improve access to high quality education.

### 2.4.2 Competitiveness Driven Reforms

The goal of the competitiveness driven reforms is to raise the productivity of labour and of educational institutions, even if this calls for higher spending on education. This can be achieved by improving the quality of labour, which again means expanding educational attainment and improving learning quality at every level. According to Carnoy (1999), quality is measured by students' activity, but also by education's relevance to a changing world of work. The competitiveness driven reforms can be categorized into four groups; decentralization, standards, improved management and improved teacher recruitment and training. Decentralization indicates a shift in decision-making power from central to local level for a more efficient and effective delivery of education (Carnoy 1999). The quality of education is meant to improve with the responsibility this brings on to the educational staff. School choice and vouchers are introduced in many countries with the presumption that more competition will encourage innovation and improvement (Coeyman 2003).

Simultaneously, says Carnoy (1999), in countries already decentralized, reforms have focused on higher learning standards provided by a central authority. These standards lay down the criteria of academic expectations to schools with testing and accountability as means to control the achievement. The third category of competitiveness driven reforms is to improve management of educational resources. One of the demands for better management is improved teacher effort and innovation (Carnoy 1999). It is argued that locally managed schools are more effective in their allocation of resources due to larger flexibility. The last category is quality improvement of teacher recruitment and training since teachers are seen as very important in the provision of quality education.

### 2.4.3 Finance Driven Reforms

The main concern for the finance driven reforms is how to pay for education that leads to improved productivity and increased standards. Most governments are under pressure to reduce the growth of public spending on education and to find other sources of funding for

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an expanding education system (Carnoy and Rhoten 2002). Carnoy (1999) argues that the nation state has to adjust to the new global economy, and reduction of government public spending is just as important as to increase school productivity. Finance driven reforms are set in the context of the increased competition among nations in the international economy. There are three main finance driven reforms; the shift of public funding from higher to lower levels of education, the privatization of secondary and higher education and the reduction of cost per student in all levels of education. The shift in payment away from higher education is due to the high cost of higher education compared to low cost of basic education. The shift of spending is supposed to provide more resources for all primary students and thus increase their opportunities (Carnoy 1999). An expansion of secondary and higher education is expected in a knowledge based globalized world. This will be too costly to finance for many countries, and one answer can be to privatize this sector of education. It is argued that for efficiency and equity reasons the student should pay in accordance to level of education; the higher level the larger fees. In order to reduce the cost per student at all levels, one of the answers is to increase class size. World Bank economists claim there is no effect of the student/teacher ratio in the range of 20 to 45. Meaning that one teacher may teach 45 students at a time with same quality as if the numbers of students were only 20. This way schools can save public spending by reducing the number of teachers (Carnoy 1999).

#### 2.4.4 Equity Driven reforms

The equity driven reforms attempt to improve education's important political role as a source of social mobility and equality of economic opportunity. Everyone should have equal access to high quality education because educational attainment is crucial in determine earnings and social position. According to Carnoy (1999), education pays off in the globalized economic environment, but increased pay off to high level skills relative to low level skills pushes the governments away from equity driven reforms. The argument is that investments in greater equity can reduce economic growth, and it becomes a competition between equity and efficiency, quality and equality. In addition, the finance driven reforms dominate educational change, and these reforms often increase inequity in the way they provide education (Carnoy 1999). On the other hand, it is argued that investment in greater access to education for low income children might yield a higher potential return because

these children are more motivated than children from higher income families. If the latter really is the case, then governments can justify investments where both competitiveness and equity are increased (Carnoy 1999).

The equity driven reforms have different character in developing countries and industrialized ones. The main goal in developing countries is to reach the lowest income groups with high quality basic education, especially women and rural population with low access to basic skills. In industrialized countries equity driven reforms are targeting “at risk” and special needs students. Every single child should have access to the same school and the school is supposed to act as a melting pot and provide quality education for each and every student (Carnoy 1999).

## 2.5 The Forces of Globalization

The Secretary General of OECD, Angel Gurría (2007a), states that globalization is the driving force behind today’s educational reforms. Former director of UNESCO’s International Institute for Educational Planning (IIEP), Gudmund Hernes (2001), says the organization of education, how it is planned, provided and paid for, has been largely influenced by globalization. Carnoy (1999) agrees that globalization is having a major impact on education, both directly and indirectly, and believes that the way a nation responds to the changes in the world economy due to globalization is reflected in educational reforms. However, he continues, we need to ask how globalization, as a larger ideological package, affects education. It is not always easy to differ between the effects of globalization and an ideology pushing the development of the global education in a particular direction. Educational decentralization with a shift in decision-making power from central to local level may be an expression of globalization, but it may also be the product of an ideology that sees centralist states as bureaucratic and a hindrance to private sector growth.

According to Carnoy and Rhoten (2002), globalization creates unique challenges to each country, since each country is situated in its own economic, political, and cultural environment. Thus, policies need to be contextually sensitive and responsive to the needs of the nation’s economy and society as a whole. The biggest challenge is to shape the

educational system and hold on to the national identity without become victim to the pressures of globalization and its many converging factors. Carnoy and Rhoten (2002) argue that the nation states are not helpless to the forces of globalization. Nations are free to choose a more equitable knowledge production, and it is much more space, both political and financial, than their answer to globalization usually admits. “Globalization may not be a choice – but the kind of globalization that evolves is”, Hernes (2001:21) declares, and Dale (1999) states that globalization does not leave state with no choice, but states respond to challenges differently. The policy making procedures and outcomes are impacted, but effects are indirect. Dale argues that we are not forced by globalization; we chose to implement new reforms in order to be able to compete on the free market. Because knowledge is the most highly valued commodity in the global economy, nations have little choice but to increase their investment in education.

The quality of national educational systems is increasingly being compared internationally. This has placed emphasis on math and science curriculum, standards and testing, and on meeting standards by changing the way education is delivered. Testing and standards are part of a broader effort to increase accountability by measuring knowledge production and using such measures to assess teachers and managers (Carnoy and Rhoten 2002).

Educational changes in response to globalization share certain defining parameters, but still vary greatly across regions, nations and localities. The vast majority of school students are still educated in state schools, argue Henry et al. (1999), and the nation state still provides much of the funding for education. Hence, the state still retains some power, and in some ways may have extended its reach through the web of accountability mechanisms that follow decentralization policies. However, the emphasis on evaluation at regional and continental level is on mathematics and science, whether the country prioritizes these subjects or not. The increased attention to knowledge is rooted in the human capital theory, which will be discussed in the following section.

## 2.6 Human Capital Theory

When the educational system expanded massively after World War II, the system developed in the direction of becoming an investment both for the individual and the society. Education

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was still regarded as a way to improve the individual choices available to men, but now, in addition, an educated population was called for to provide the type of labour force necessary for industrial development and economic growth. This was a linking of education to the labor market which increased the demands and challenges upon education (Fagerlind and Lawrence 1989, Lundgren 1990). During the 1950s and 1960s, several economists presented theories based on correlation between investment in education and economic growth. The Organisation for Co-operation and Development (OECD) was a key player in developing these theories and encouraged governments to use them in national educational planning (Fagerlind and Lawrence 1989, Lundgren 1990). This economic approach to the analysis of education, known as human capital theory, with its link between investment in education and economical growth, suggested that quality was more important than quantity. Education represented higher quality in labor and thus an improvement in the nation's potential for economic growth (Teixeira 2000). The improvement of the human workforce was treated as a form of capital investment, and education was not viewed simply as a form of consumption, but rather as a productive investment. This theory attributed the source of underdevelopment or economic stagnation to factors within the country rather than to factors outside the country. To invest in human capital was seen by policymakers and politicians to result in rapid economic growth for society and economic success and achievement for individuals. Human capital theory provided a basic justification for large public spending in planning and expansion of education both in developed and developing countries (Fagerlind and Lawrence 1989, Lundgren 1990).

During the 1960s, governments also viewed education as a major instrument for improving and equalizing social opportunities; to promote social mobility. In the 1970s, the theory of human capital was challenged by alternative theories claiming that education had private benefits, but no social ones. Education had not benefited poorer classes, there were income inequalities and weak social mobility. Graduates were entering the labour market quicker than the market could absorb them, leading to lower wages and unemployment and thus lower rate of return. Rate of return is a key feature of the human capital model, because education is viewed as an investment with an anticipated yield, or rate of return (Teixeira 2000). The 1980s started with more scepticism towards the human capital theory, due to the criticism and an increased financial restriction on public expenditures. The role between education and economy was regarded as more complex than the human capital model



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suggested, and there were important motivations other than economical ones in the demand for education. Human capital theorists developed reformulations on the model, moving towards a more complex picture of the economic role of education, but without challenging the central element. The central element remained; “education as a profitable investment both in private and in social terms and individual decisions about how much education to pursue are made on a cost-benefit analysis” (Teixeira 2000:269). The human capital model regained confidence in the 1990s when the theory acknowledged a more complex reality besides education and income, but still without affecting the theory’s central core (Teixeira 2000). Schultz (1993) sees the survival of the human capital theory for all these years as verification for human capital, the acquired abilities of people, as the reason and explanation for most of modern economic progress. When building human capital, the result is increased social return both for the individual and the nation, but as Levin (1989) says, investment in human resources is the foregone expenses, and it takes a long time for that investment to pay off.

Gurría (2007a), the Secretary General of OECD, declares that the development of any society lies in the improvement of its population, which holds the nation’s human capital. Human capital is considered as the knowledge, skills, competencies and other attributes embodied in individuals that are relevant to personal, social and economic well-being. He states that quality education is one of the most valuable resources possessed by a society and an individual in today’s competitive globalized economy. Human capital is needed for a nation to compete on the global market, and human capital is achieved within an effective and innovative education system. Faulty educational systems on the other hand, will result in declining standards, exclusion and unemployment (Gurría 2007a). OECD data shows that labour force participations rates rise considerably with educational attainment in most OECD countries. International comparisons demonstrate the essential role education plays in promoting labour productivity and consequently economic growth, which underlines why a solid foundation of knowledge and skills at school is fundamental for the future success of individuals and societies (OECD 2007b).

OECD has developed devices to help policymakers to measure educational outcomes and judge performance in comparison to other countries. One of these devices is the Programme for International Student Assessment, PISA, a study on how well prepared 15-year-olds are

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to meet the challenges of today's knowledge societies. Data from the PISA 2006 study will be employed in the analysis part of this thesis when looking for a connection between student achievement and level of decentralization.

### **3. PISA**

My study is largely based on data from the Programme for International Student Assessment (PISA), thus the PISA survey is accentuated in this part of the thesis. The chapter starts with some general background information on PISA, followed by a thorough description on how the data employed and utilized in the PISA 2006 study are sampled, collected and assessed.

#### **3.1 PISA 2006, Facts and Figures**

PISA is an international study that assesses student performance and collects data on the student, family and institutional factors that can help to explain differences in performance. PISA is the product of collaboration between participating countries and economies through the OECD, and draws on leading international expertise to develop the assessment and decide the background information to be collected. The contribution made by experts from the participating countries helps to assure valid comparisons across countries and cultures (OECD 2007a). Around 400 000 students participated in the PISA 2006 survey, representing about 20 million 15-year-olds in the schools of the 57 participating countries. 30 countries are OECD-members while 27 are partner countries and economies, making up close to 90% of the world economy (PISA 2007b).

PISA was officially launched in 1997. It is a triennial survey measuring the knowledge and skills of 15-year-old students in reading, mathematics and science literacy. The age of 15 is selected because at this age, in most OECD countries, students are approaching the end of compulsory schooling, and assessing young people at this stage is regarded as giving a useful indication of the performance of education systems. PISA uses the terminology of “literacy” in each subject area to denote its broad focus on the application of knowledge and skills. The three subject areas are all included in every assessment, taking turn being the major domain. Three PISA surveys have taken place so far; in 2000 (reading); 2003 (mathematics) and 2006 (science). This sequence will be repeated with surveys in 2009, 2012 and 2015. In 2006 the focus was on science literacy with the two other domains as smaller components (OECD 2007a). Since data in the same subject will be collected every

third year, trends over time in both the performance of students in the countries and across countries can be monitored. This provides a valuable knowledge base for policy analysis and research (Kjærnsli et al. 2004).

The PISA survey collects information on a wide range of factors such as how the students approach learning, the students' background, and various characteristics of the schools. However, the main bearing is on student performance (OECD 2004). The PISA project represents a typical quantitative and comparative study, and one of the main goals is to establish valid and reliable estimates of student achievement (Lie and Roe 2003). The main study has the purpose of obtaining a data file that will lead to analyses which will provide valid cross-national statistical inferences about the student population, and the characteristics of the schools that they are in (OECD 2005d). The design and implementation of the survey, within the framework established by the PISA Governing Board, is the responsibility of an international consortium led by the Australian Council for Educational Research (ACER). In addition to ACER the consortium exists of Netherlands National Institute for Educational Measurement (CITO), Educational Testing Service (ETS, USA), National Institute for Educational Policy Research (NIER, Japan) and Westat (USA). The PISA National Project Manager administers the implementation of PISA in each participating country (OECD 2005d, Kjærnsli et al. 2007).

The primary aim of PISA is to measure how well 15-year-old students are prepared to meet challenges of today's knowledge societies. The assessment is forward looking, focusing on young people's ability to use their knowledge and skills to meet real-life challenges, rather than mastering a specific school curriculum. This emphasis on testing in terms of mastery and broad concepts is important considering the concern among nations to develop human capital in order to meet the demands in the globalized knowledge economy (OECD 2007a). On the PISA 2006 science scale, Finland was the highest-performing country, followed by Hong Kong-China and Canada. Australian students are also top-achievers, while Sweden is at OECD-average and Norway's score is below OECD-average (Appendix A).

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## 3.2 Why Science Literacy?

OECD proclaims that today, knowledge of science and about science is more important than ever. Science is relevant to everyone's life, making how science is taught and learned especially important. The assessment of students' scientific knowledge and skills in PISA is rooted in the concept of scientific literacy. This involves being able to possess and use scientific knowledge to for example acquire new knowledge, draw evidence-based conclusions about science-related issues and to understand the characteristic features of science as a form of human knowledge (OECD 2007a). According to OECD (2006), a workforce highly skilled in science is important to the economic well-being of countries. Basic science skills are generally considered important for the inclusion of new technology, while high-level science competencies are essential for generating new technology and innovation. Thus, highly educated workers in the labour force are an important determinant of the country's ability to compete on the world market and improve economic growth and socio-economic development.

Compared to the earlier definition of scientific literacy in PISA, the 2006 definition has been elaborated and enhanced by including attitudinal aspects of students' responses to issues of scientific and technological relevance. How the students report their own motivation to learn, their beliefs about themselves and their attitudes to what they are learning has relevance to lifelong learning. Except for the addition of attitudinal responses, the 2006 definition is conceptually the same as it was in 2000 and 2003. The attitudinal element is reported separately and has no impact on the comparability of the subject scores (OECD 2006).

## 3.3 Sampling in PISA

Approximately 400 000 students were randomly selected to participate in PISA 2006. The target population for PISA, referred to as 15-year-olds, is students between 15 years and 3 completed months and 16 years and 2 completed months (OECD 2005d). All participants have to attend educational institutions located within the country and have completed at least 6 years of formal schooling, regardless of type of education, full-time or part-time, academic

or vocational programmes, public or private schools or foreign schools within the country (OECD 2007c). The following sub-chapters elaborate the sampling procedures in PISA and explain by which criteria the students and schools are chosen to participate in the PISA 2006 survey.

### 3.3.1 Random Sampling

National or international surveys usually collect data from a sample. Dealing with a sample rather than the whole population is preferable for several reasons; identifying all members of the population might not be possible due to the nature of the target population; be too time consuming; require unreasonable budgets and the whole population does not necessarily give additional information to the survey. All sample designs aim to avoid bias in the selection procedure. Nevertheless, bias in the selection can arise if the sampling is done by a non-random method, which means the selection of participants is consciously or unconsciously influenced by human choices. Randomness in the selection procedure is of utmost importance and without a random sampling where every unit in the target population has equal chances to be selected, the results might be biased (OECD 2005d). Another bias occurs when the sampling frame that serves as the basis for selection does not cover the complete population adequately. This happens when parts of the population cannot be found or refuse to co-operate. In educational surveys schools might refuse to participate, and some students might refuse to participate or be absent the day of the assessment. To avoid such bias, a minimal participation rate should be required (OECD 2005d).

In PISA established and professionally recognised principles of scientific sampling are used to make sure the participants represent the entire PISA target population. National sampling plans are well-documented and based on scientific sampling methods. The need for rigorous, standardised and documented sampling applies to the selection of schools as well as students within schools (OECD 2005d).

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### 3.3.2 Sample Design

The sample design for PISA is generally referred to as a two-stage stratified sample. Surveys in education usually draw a student sample in two steps, so also in the PISA survey (OECD 2005d). First, a sample of schools is selected from a complete list of schools containing the student population of interest. The comprehensive national list of all eligible schools is called the school sampling frame. The number of schools is selected with the expectation that there will be at least 150 participating schools in each country, or all schools if the number of schools with eligible students are less than 150, once field exclusions, ineligibility and non-response are accounted for. Thus, replacement schools are identified at the same time, in case they are needed to replace non-participating sampled schools (OECD 2005d, OECD 2007d). In order to keep track of sampled schools and replacement schools in the PISA database, all sampled schools and replacement schools are assigned unique identification numbers by ACER (OECD 2005d).

The second stage of the sampling is the random selection of students within the selected schools. All eligible students in the schools that are listed on the school sampling frame represent The National Defined Target Population. The National Defined Target Population is the National Desired Target Population, which provides total national coverage of eligible students possible, minus exclusions (OECD 2007d). The within-school sample size is referred to as the ‘target cluster size’ and is nominated by each PISA participant. There has to be at least 20 sampled students from each school so as to ensure adequate accuracy in the measures for variation within- and between-schools, which is an important analytical objective of PISA (OECD 2007d). To make sure the complete population is adequately covered, school response rates must be above 85% of sampled schools and the student response rates must be above 80% of sampled students. The student sample size in each participating country should be minimum 4 500 students, or the National Defined Target Population (OECD 2005d).

### 3.3.3 Weighting

Weighting is necessary to avoid bias if the sampling units do not have the same chances to be selected. A sampling unit with a very small probability of selection will be considered as

more important than a sampling unit with a high probability of selection. Weights are therefore inversely proportional to the probability of selection. At the same time, a sample is only useful to the extent that it allows the estimation of some characteristics of the whole population. This means that the statistical measures for the sample, like a mean, a standard deviation, a correlation, a regression coefficient, and so on, can be generalized to the population. This generalization is more reliable if the sampling requirements have been met (OECD 2005d).

In the official PISA documents the data is weighted, but in my dataset it is not. For some countries the weighting of data might be crucial for the average science score, but for the five chosen countries in my study, the difference between weighted and unweighted data is noteworthy only for Canada with a science score of 534 for weighted data versus 519 for unweighted. However, the main objective of my analyses is not to examine the average science score in the countries; it is the variance in student achievement within the country that is of interest, and how this correlates with other variables like level of school autonomy.

### 3.3.4 Field Trial

A field trial with two main purposes precedes the PISA study. One of the purposes is to collect data to ensure that the instruments developed for the main study contain test and questionnaire items that are sound in all countries, including a proper translation. The other is to test the operational procedures for sampling students and conducting assessments within schools (OECD 2005d). The only changes between the field trial and the main study for listing and sampling students within schools will be enhancements that are developed in the procedures as a result of the field trial, or if there are any new national requirements that did not exist when the field trial was conducted (OECD 2005d).

### 3.3.5 Exclusions

Exclusions from the National Desired Target Population are to be kept to a minimum. National Defined Target Population should cover 95% or more of the National Desired Target Population (see Chapter 3.3.2). All exclusions, at both the school level and the



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within-school level, must be described and quantified by the National Project Manager and reported to ACER. An exclusion of 5% of the National Desired Target population should not be treated as a limit where everything below is acceptable (OECD 2005d).

Usually, there are practical reasons responsible for the exclusion of schools and students. Exclusions of entire schools can be due to geographical inaccessibility, extremely small school size or when administration of PISA is not feasible. Students within sampled schools can be excluded if they are functionally disabled, intellectual disabled or have insufficient proficiency in the language of assessment. Functionally disabled students excluded are those who are permanently physically disabled in such a way that they cannot perform in the PISA testing situation. Functionally disabled who can respond should be included in the testing. Intellectually disabled students excluded are those who cannot perform in the PISA testing situation due to mental or emotional disability, and those who are cognitively delayed and unable to follow even the general instructions of the test. Students should not be excluded based on poor academic performance or normal discipline problems (OECD 2005d). Students can be excluded for insufficient language experience if they are; not native speakers in the assessment language; have limited skills in the assessment language and have received less than one year of instruction in the language of assessment. The students must meet all three criteria to be excluded for inadequate language proficiency.

### 3.4 Collecting Data in PISA

In PISA each participating student spent two hours carrying out pencil-and-paper tasks. PISA contains tasks requiring students to construct their own answers as well as multiple-choice questions within the subjects of mathematics, reading and science, with an emphasis on science in the PISA 2006 survey. A total of about seven hours of test items is covered, with different students taking different combinations of test items where each combination covers approximately two hours of testing. Students also answered a questionnaire that took about 30 minutes, providing information about themselves and their home background. The language of the PISA test administered to a student was the language of instruction provided by the school to that student in the major domain (Science) of the test (OECD 2007d). The principal of the school, in which students were assessed, provided information on their

schools characteristics by completing a 20-minutes questionnaire. Each country completed the student assessment during a period not exceeding 42 consecutive calendar days between March 1, 2006 and August 31, 2006, unless otherwise agreed upon between the National Project Manager and the Consortium (OECD 2005d, OECD 2007b).

### 3.5 Assessment of the Data

PISA assesses how far students near the end of compulsory education have acquired some of the knowledge and skills that are essential for full participation in society. Instead of focusing on the extent to which the students have mastered a specific school curriculum, the students' ability to use their knowledge and skills to meet real-life challenges are tested (OECD 2007b). The PISA consortium has contracted expert groups from the participating countries to submit questions for the assessment. All questions are reviewed by the consortium and by participating countries, and they are carefully checked for cultural bias. Only those questions that are unanimously approved are used in PISA (OECD 2007b). In the PISA survey each country has its own group of test correctors, overseen by the country's National Project Manager. The corrections are cross-checked by other experts, and the final results are then sent to ACER, which in turn transmits the final data to the OECD Secretariat (OECD 2005b).

## **4. Presentation of the Educational System in Australia, Canada, Finland, Norway and Sweden**

The 5 countries chosen for this study is Australia, Canada, Finland, Norway and Sweden. In this chapter the countries' educational system, policies and reforms will be presented, alongside the context in which the educational system works. A context includes among other things the political history and curricular tradition of the country. The main focus, however, is the educational system with current reforms and their emphasis on educational decentralization. The countries are presented alphabetically, and in the last paragraph of the chapter similarities and differences between the countries are highlighted.

### **4.1 Australia**

Australia does not have a single national education system, but a Commonwealth Government with a federal education minister that oversees six State and two Territory Governments. Each state and territory has its own ministry of education, which is constitutionally responsible for the provision of government schooling. The jurisdictions set their own teacher qualifications, establishes standards, monitor statistics and raise revenue, but the overall structures are similar (DEEWR 2009). Since 1993, cooperation between the federal Department of Education, Science and Training, DEST, and the state and territorial ministries is achieved through the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA). In 2007, a new department was created; The Department of Education, Employment and Workplace Relation (DEEWR), replacing DEST and the Department of Employment and Workplace Relation. Despite the lack of any significant constitutional role, the federal government has increased its influence over the past couple of decades and plays an active role in helping the states and territories meet their educational objectives (DEEWR 2009).

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Australia has been a dominion within the British Empire, and the Australian population is mainly from a European background. From 1901 until 1973 White Australian Policy<sup>1</sup> restricted non-white immigrants to Australia, but recent immigration has produced a greater ethnic and cultural diversity. About 4% of Australian school students are indigenous (Aboriginal or a Torres Strait Islander), and English is the language of instruction in education. About 67% of the students are in government schools, ca 20% in Catholic schools and the rest in various independent schools, religious and non-religious (DEEWR 2009). Education is compulsory from ages 6 to 16 with several states extending the age of compulsory schooling. In primary and secondary schools students normally progress each year from one grade to the next, but special circumstances may lead to retention at the end of grade 10. Primary responsibility for funding government school education rests with the respective governments in the states and territories. Tax revenues provide almost all the financial resources for the operation of government schools, but many schools seek voluntary contributions from parents and raise funds from other local sources as well, while the Australian Government assists with supplementary funding. General recurrent grants to government school systems are provided as block grants calculated on a per student basis. The finances to the private schools are partly based on socio-economic conditions in the neighbourhood, and the government contributed in 1999 with 57% of the expenditures of the non-government schools while the rest was student fees and money from sponsors. Church schools predate government schools, and due to their long history, the continued government support of them has been relatively non-controversial (Thomson et al. 2007). According to Gurr and Drysdale (2007), education in Australia can be characterized as a complex interplay between the different levels of government and between government and non-government schools with an opaque financial system.

Australian schools have had numerous new reforms since the 1970s when the education system moved towards decentralization and School Based Management (SBM) as a strategy and means in introducing educational reforms (Kenway 2008). The concept of SBM was developed in the Australian Capital Territory, ACT, in the mid 1960s, implemented in 1974 and later adopted by all school systems in Australia (Gammage 2008). The central authority

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<sup>1</sup> Store Norske Leksikon [http://www.sn1.no/Australia/historie\\_%E2%80%93\\_2](http://www.sn1.no/Australia/historie_%E2%80%93_2) 03.03.09

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within the states specifies the curriculum and standards framework, and the extent of school based management varies between the jurisdictions. In most jurisdictions schools have autonomy in deciding curriculum details, textbooks, and teaching methodology at primary and lower secondary levels, and also to some extent responsibility for budget administration and staffing (Thomson et al. 2007). In 2004, the Federal Minister for Education published *National Framework for Schools*, a ten point plan for Australian schooling with higher level of school autonomy as one of its key features (DEST 2004).

The ten point plan released in 2004 was a national agenda for schooling with the intention to strengthen all schools. National consistency in key areas of the curriculum was emphasized alongside a great focus on literacy, numeracy and technology. All schools should be held accountable for their performance, and the plan specified the need to strengthen indigenous education outcome (DEST 2004). In December 2008, the MCEETYA (Ministerial Council on Education, Employment, Training and Youth Affairs) released *The Melbourne Declaration on Educational Goals for Young Australians* which sets the direction for Australian schooling for the next 10 years (MCEETYA 2008). The Melbourne Declaration supersedes *The Hobart Declaration* from 1989 and *The Adelaide Declaration on National Goals for Schooling in the 21<sup>st</sup> Century*, released in 1999. In the Hobart Declaration and the Adelaide Declaration, the State, Territory and Commonwealth Education Ministers committed to work together to ensure high-quality schooling for all young Australians. The National Goals in the Adelaide Declaration in 1999 focused on mathematics and science as key learning areas, moreover it provided a framework for national reporting on student achievement and for public accountability by school authorities (MCEETYA 1999). The Melbourne Declaration builds on the same goals, but also identifies the changes in a global world that are placing new and greater demands on Australian education. With the Melbourne Declaration, the Australian Education Ministers seeks to collaborate with all school sectors to ensure world-class curriculum, with a strong focus on literacy and numeracy skills, and become second to none amongst the world's best school systems (MCEETYA 2008). To achieve greater national consistency, the jurisdictions were required to develop Statements of Learning in five domains; English, mathematics, science, civics and citizenship, and information and communications technology (ICT). The statements were to be implemented by 1 January 2008 alongside common testing standards in the five

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domains for grade 3, 5, 7 and 9. The development work and implementation is supervised by the Ministerial Council of Education (MCEETYA 2009).

The educational ministers signalize through their declarations and statements that they are influenced by the competitiveness driven reforms. They seek efficiency, effectiveness, accountability, quality and also equity by decentralizing their educational system and establish school based management. The national goals for schooling are that the young people will contribute to the economic, cultural and social development in a local and global context, and to develop a disposition towards learning throughout life and become attractive employees (DEEWR 2009).

## 4.2 Canada

Canada is the second largest country in the world by total area, 31 mill people unevenly spread (2/3 lives within 100 km of the southern border with the US), 10 provinces 3 territories and two official languages (English and French). Canada has no central ministry or department of education; each of the thirteen jurisdictions contains its own ministry of education responsible for the organization, delivery, and assessment of education (CMEC 2009). The federal government has no direct authority over primary and secondary education, but may provide indirect support through transfer payments to the provinces and territories. However, the responsibility for the education of the about 4.4% indigenous people (Indians and Inuit) in Canada rests with the federal government (CMEC 2009). The coordination between the federal government and the jurisdictions is through the Council of Ministers of Education Canada (CMEC). CMEC, formed in 1967, consists of the provincial and territorial education ministers. It is an intergovernmental body through which the ministers discuss matters of mutual interest and sets priorities for nationwide educational initiatives. CMEC is the national voice for education in Canada (CMEC 2009). In 1993, the provincial and territorial education ministers agreed to create the Pan-Canadian Education Indicators Program, PCEIP. The PCEIP mission is to publish a set of statistical measures on education systems in Canada for policy makers, practitioners and the general public to evaluate the performance of education systems across jurisdictions and over time (CESC 2006).

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Like Australia, Canada was also a domain within the British Empire, consequently the countries are historically, linguistically and politically influenced by the UK. Canada is often referred to as a multicultural and multiethnic country, and according to *Canada's Immigration Program*<sup>2</sup> issued in 2004, Canada has the highest per capita immigration rate in the world (Library of Parliament 2004). Immigrants tend to be highly educated, and the Canadian system puts great emphasis on finding skilled immigrants. As a bilingual country, Canadians have the right to access publicly funded education in either minority language (French or English). The ages for compulsory schooling in Canada vary from one jurisdiction to another, but most require attendance in school from age 6 to age 16. Grade progression policies vary between the jurisdictions (CEA 2007). Public funding for education comes from the provincial or territorial government and through local taxes. Provincial and territorial regulations set the level of funding for each school board based on number of students, special needs, and location. Public and independent schools that are publicly funded serve about 93% of all students in Canada. The legislation and practices concerning the establishment of non-public educational institutions vary from jurisdiction to jurisdiction. Some jurisdiction provide for tax-supported independent school systems, some provide for partial funding if certain criteria are met and some does not fund non-public schools at all (Lalancette et al. 2007, Walker et al. 2007, CMEC 2009).

There are some similarities in the provincial and territorial education systems across Canada, but between the autonomous jurisdictions exists substantially differences in curriculum, assessment, and accountability policies. The educational ministries typically define the policy and legislative frameworks, including curriculum and assessment policy, provide funding and define the educational services available. Provincial and territorial education ministries have the power to delegate authority to local school boards and thus determine the scope of local control (CEA 2007). The publicly elected members of the school boards are usually entrusted the operation and administration (including financial) of the group of schools within their board, curriculum implementation, responsibility for personnel and enrolment of students (CMEC 2009). The level of school autonomy varies between the 13 Canadian jurisdictions. The decision-making power is allocated in various ways between the

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<sup>2</sup> Library of Parliament: [Canada's Immigration Program \(October 2004\)](#) 07.03.09

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ministry, school boards and principal/teachers. In some jurisdictions, for example, teachers are involved in curriculum design, while in others the teachers' responsibility is limited to the implementation in cooperation with the local school board (Lalancette et al. 2007, Walker et al. 2007).

Several recent examples of large-scale educational reform can be found in jurisdictions across Canada. These reforms include changes in both the provincial curriculum and the organization of schools (CCL 2009). Even if the provinces and territories are autonomous, in 1993 the federal government announced a strategy with authority to set national targets to improve education, and by 1997 the CMEC was completing a framework for a national science curriculum (CMEC 2009). In April 2008, a new vision for learning in Canada, *Learn Canada 2020*<sup>3</sup>, was released by CMEC (Council of Ministers of Education Canada). This is the framework that the educational ministers, through the CMEC, will use to enhance Canada's education systems. *Learn Canada 2020* covers lifelong learning from early childhood to adulthood and addresses the most pressing education and learning issues facing Canadians today. The act acknowledges the direct links between a well-educated population and a knowledge-based economy in the 21<sup>st</sup> century and highlights enhanced personal growth opportunities for all Canadians. Literacy, numeracy and science are recognized as key subjects in elementary through high school. Other areas emphasized are elimination of the gap in academic achievement rates between indigenous and non-indigenous students, measuring student achievement by implementation of national and international learning assessment programs and to strengthen the relationship between local, state and federal level (CMEC 2008).

There are big differences in how education is operated in the provinces and territories in Canada. The PISA 2006 survey reveals results ranging from provinces achieving close to top score on the PISA statistics to the mediocre ones slightly below OECD-average (CMEC 2009). With the new reform CMEC wants to improve the relationship between all levels of education in Canada in order to increase the educational quality throughout Canada.

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<sup>3</sup> Council of Ministers of Education, Canada <http://www.cmec.ca/Publications/Lists/Publications/Attachments/187/CMEC-2020-DECLARATION.en.pdf> 20.03.09



Competitiveness in the global economy has been and continues to be an important priority for the CMEC. Knowledge is regarded as a commodity, and the council emphasizes a well-educated population to protect Canada's national interests in a common global future (O'Sullivan 1999).

### 4.3 Finland

The Ministry of Education is the highest educational authority in Finland. Basic education is based on objectives set out in the *Basic Education Act and Decree* of 1998 and within the *National Core Curriculum*. The policy of the Finnish educational system is defined in the *Development Plan for Education and University Research*, confirmed by the Government every four years (Eurydice 2008). The Finnish National Board of Education (FNBE) is the national agency responsible of the development of education. Tasks assigned to FNBE involve creation of the national curriculum, implementation of educational development programmes, maintaining national and international databases and evaluate learning results (FNBE 2009a). The municipalities are responsible for provision of education and implementation of objectives. The Educational Evaluation Council, appointed in 2003, is in charge of national evaluations and quality development in education. (Eurydice 2008).

Basic education in Finland covers nine years comprehensive school, from age 7 to age 16. Finland practises grade repetition; about 2% of the students have to repeat a year, mostly during the first or second school year and about 0.5% of the students fail to be awarded the basic education certificate. Finland has two national languages, Finnish and Swedish. Approximately 5.5% of the population has Swedish as their mother tongue, and both language groups have the right to education in their own mother tongue. Local authorities are also required to organize education in the Sami-language in the Sami-speaking areas of Lapland (FNBE 2009a). Less than 3% of students in basic education attend non-public schools. Independent institutions follow the national core curricula and qualification guidelines confirmed by the FNBE. They also receive the same level of public funding as publicly funded schools. Responsibility for educational funding is divided between the State and the municipalities. The municipalities are given lump sum funding and allocate the money within their area of jurisdiction (Eurydice 2008).

In Finland, the belief in a heavily centralized planning and steering system in education came to an end during the 1980s (Rinne et al. 2002). Now the education system is flexible, and the administration is based on the principal of centralised steering with local implementation. Municipalities are responsible for the organisation of education and the implementation of the aims, and they determine how much authority is passed to schools. Within the framework of legislation and core curriculum, schools and municipalities form their own curriculum sensitive to the local context. Teachers choose their own teaching methods and have freedom to select their own teaching materials (FNBE 2009a, Eurydice 2008). Staff has lost the right to choose the principal, who has become the representative of the employer in the school, the managing director (Rinne et al. 2002).

The goal of Finnish educational policy is to offer every citizen equal possibilities to get education regardless of age, place of residence, economic status, gender or mother tongue. The objective of the development plan period lasting to 2012, defined in the *Development Plan for Education and University Research*, is to enable an efficient, equal and high-quality basic education. Current key areas are teaching of mathematics and science, language and internationalization and lifelong learning (FNBE 2009a). The Finnish National Board of Education recognizes education as a factor for competitiveness, and wants to raise the level of education and upgrade competencies in the population at whole, especially the work force. Politicians from left to right have shared the idea of education as a guarantee of success in the global market (FNBE 2009b). There are no national tests of learning outcomes, no school league tables or external bodies controlling the teachers or the headmasters in the Finnish system, compulsory education is only controlled by the national core curriculum (FNBE 2009a, Eurydice 2007).

Education in Finland is highly impacted by the knowledge society and the belief in knowledge as a means to be competitive at the world market. Finnish education policy emphasizes quality, equity and internationalisation, and they highlight the need for a well educated workforce. In order to be more efficient, decentralization efforts have been made, first and foremost to the municipality level, but also schools enjoy larger autonomy. Finland has been among the top achievers in every PISA survey since the start in 2000, therefore many policymakers and educators around the world are looking towards Finland to learn from their education system (FNBE 2009b).

## 4.4 Norway

In Norway, the overall responsibility for all areas of education lies with the State through the Ministry of Education and Research. Compulsory education is administered and managed according to the *Education Act* of 1998, and the Ministry determines standards and the general framework of teaching through the national curriculum. There are two Educational ministers in Norway, one responsible for education from pre-school through upper secondary school, and the other responsible for higher education and research (Ministry of Education and Research 2009, Eurydice 2008). The Directorate for Education and Training is the executive agency for the Ministry of Education and Research and has the responsibility for the production of national curriculum, assessment, supervision and development of primary and secondary education. The Directorate is also responsible for the new National Quality Assessment System (NQAS) for primary and secondary education, created to ensure that all students receive the high quality education they are entitled to. The municipality authorities manage compulsory education and implement objectives and regulations (Onstad and Grønmo 2007, Eurydice 2008).

The population in Norway is both widely dispersed and largely homogeneous. In Norway, all students in compulsory school have the right to be educated in their own language. There are three official written languages in Norway; Bokmål, Nynorsk and Sami. Each municipality decides which language is used in its schools. Compulsory schooling in Norway is achieved through comprehensive school starting at age 6 and ending at age 16. There is no grade repetition in Norwegian schools. Most students in primary and lower secondary education are enrolled in public schools, 98% in 2006/07, and independent schools are considered a supplement to public education (Eurydice 2008, Ministry of Education and Research 2009). From 1986, primary and lower secondary education are financed through municipal tax revenue and block grants from the Government. Municipalities have considerable autonomy in their expenditure decisions, but some grants are earmarked, like teaching of mother tongue and Norwegian as a second language to immigrant children. Approved independent schools have 85 % of their expenses covered by the government (Onstad and Grønmo 2007).

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Norway has a centralized curriculum for all subjects in grades 1–13. Within the framework set by the curriculum, considerable freedom is given to local schools and teachers to make decisions on organization and instructional methods (Onstad and Grønmo 2007). The management of schools varies between municipalities; each municipality administration decides how much authority to delegate to their schools. The municipalities are typically responsible for running the schools, the building and maintenance of school buildings, the intake of students and the appointment of teachers (Eurydice 2007). A new reform in 2006, *The Knowledge Promotion*<sup>4</sup>, introduced certain changes in substance, structure and organization of education. A change from the previous reform, *Curriculum 1997*, which was very much centralized and detailed regarding content to be learned and teaching methods to be used, is that *The Knowledge Promotion* gives freedom at the local level with respect to work methods, teaching materials and the organization of classroom instruction (Ministry of Education and Research 2007, 2009). When the principals reported the level of school autonomy in PISA 2006, the old curricula, with less autonomy, was followed.

The overall objective of Norwegian educational policy is to provide equal opportunities for all, irrespective of sex, geographic location or economic-, social- or cultural background. The aim is to offer all children an education that is adapted to the abilities of the individual student. In addition, a high general level of education in the entire population and opportunities for life-long learning is highlighted (Ministry of Education and Research 2009). Educational reforms in Norway usually emphasize largely on equality. The school quality should be the same all over the country and the comprehensive principle is very strong (Telhaug 1997). There was a change of ideology in the 1990's with a stronger focus on the subjects and students achievement. In 2004, National tests in mathematics, reading and English were implemented in grades 5 and 8 in order to secure the quality of education throughout the country. The new reform implemented in 2006, *The Knowledge Promotion*, gives priority to develop basic skills that will ensure students the competency needed to meet the challenges of the knowledge society. The reform introduces five basic skills to be applied in every subject at every level; oral skills, writing skills, reading skills, digital skills and numeracy. In addition, more time has been allocated to mathematics and science in the

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<sup>4</sup> Ministry of Education and Research [http://www.udir.no/templates/udir/TM\\_Artikkel.aspx?id=2376](http://www.udir.no/templates/udir/TM_Artikkel.aspx?id=2376) 21.03.09

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lower grades (Ministry of Education and Research 2003-2004, Eurydice 2008). The students in PISA 2006 followed the old curricula, since the new curricula were first implemented in the autumn 2006 (Onstad and Grønmo 2007).

*The Knowledge Promotion* clearly indicates the direction towards the competitiveness driven reforms with emphasis on competences needed in a knowledge society. Norway also wants a highly educated workforce and calls for lifelong learning. The new reform heads towards decentralization with more freedom for the educational staff to choose teaching materials and work methods. With more freedom follows accountability, and national and international testing is introduced to ensure quality in education. The new reform was strongly informed and influenced by Norwegian results on the international studies TIMSS and PISA in 2003, where Norway scored below expectations (Onstad and Grønmo 2007).

## 4.5 Sweden

The national government, through the Ministry of Education and Research, has the overall responsibility for education and sets the framework for education at all levels in Sweden. As in Norway, there are two ministers at the Ministry of Education and Research; one responsible of pre-school education to upper secondary schools, and the other responsible of higher education and research (Eurydice 2007). State regulations for the education system are stipulated in the *Education Act*, and the government sets the national curriculum and syllabuses for compulsory school. The Swedish National Agency for Education (SNAE), the largest central authority in the school area, puts forward proposals and is responsible for national tests, monitoring and evaluation of schools. A new centrally set agency, the National School Inspectorate, is responsible for school inspection, supervision and permits to independent schools, while the Swedish National Agency for School Improvement handles the task of development of the educational system (Eurydice 2008, SNAE 2009). The municipalities are responsible for providing and operating schools and for implementing the goals set by the central government. The municipalities are the authorities responsible for compulsory school, while the state is the authority responsible for special school and school for the indigenous people; Sami school (Fjellström and Ramstedt 2007, Eurydice 2008).

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Compulsory education in Sweden is carried out in a 9-year comprehensive school for children ages 7–16. If parents wish, children may start when they are 6. In Sweden, progression from year to year in compulsory school is automatic. The main language of instruction is Swedish. Nearly 1 million of Sweden's total population (9 million) are immigrants or have at least one immigrant parent. There are five official minority languages in Sweden: Sami, Finnish, Meänkieli, Romani Chib and Yiddish (Fjellström and Ramstedt 2007). There are state schools for the Sami population in the north of Sweden, where the basic curriculum are taught in both Swedish and Sami. Most students in compulsory education attend schools run by the municipalities, but an increasing number of students, 8% in the school year 2006–2007, attend grant-aided independent schools. Independent schools are open to everyone, follow the same curricula as public schools and receive grants from the municipalities according to the same criteria as the municipality's own schools (Eurydice 2008, SNAE 2009). Compulsory education is funded through the municipal budget, which is financed by state block grants and local tax revenues. There are no national regulations on how resources should be allocated between schools, but municipalities usually determine the amount based on number of students with additional resources for students with special needs. When it comes to capital expenditures such as school buildings, the municipalities show a less uniform pattern. Some municipalities prefer to decentralize responsibility for these expenditures to each individual school, while others keep responsibility for local costs at the municipal level. Additionally, some municipalities choose to handle capital expenditures within other areas, for instance within planning and building administration (Fjellström and Ramstedt 2007).

Historically education has been highly centralized in Sweden. In the recent years education policy has been dominated by an active reforming process, and the structure of responsibility and management has been altered. A centrally set national curriculum is kept, but the authority is decentralized from the state to the municipalities (Fjellström and Ramstedt 2007). To a varying degree, the municipalities delegate administrative responsibilities for schools to the local institutions in order for them to decide how to organise their work. Each municipality is obliged to set general objectives for their schools in a school plan on the basis of national requirements, and each school is required to establish a work plan based on the national goals and the school plan. The work plan should be set by the principal in consultation with the teachers and define issues such as course content, organization, and

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teaching methods (Fjellström and Ramstedt 2007, Eurydice 2008). Recruitment of teachers and other personnel is typically carried out locally within each school, alongside the responsibility for determining teachers' salaries. As stated in the national curriculum; the principal is both pedagogical leader and head of teaching and non-teaching staff, and as head of the school he/she has the overall responsibility for making sure that the activity of the school as a whole is focused on attaining the national goals (SNAE 2009, Eurydice 2008).

The Swedish curriculum for compulsory education is valid nationwide. It is a rather brief document specifying the basic values and tasks for the school. A fundamental principle of the Swedish education system is that all children and young people are entitled to equal access to education, irrespective of gender, geographic residence or financial circumstances. The aim of the curriculum from 1994, *Curriculum for the compulsory school system, the pre-school class and the leisure-time center– Lpo 94*<sup>5</sup>, is to support the integration of activities to reach the goals of compulsory school (Fjellström and Ramstedt 2007). In addition to the curriculum, there is a national syllabus for each subject. In 2000, new syllabus and grading criteria for the compulsory school were approved, and some of the syllabuses were revised in 2008. The government aims at strengthening the systematic quality work throughout the educational system, and quality is being enhanced at all levels of education. Swedish, English and mathematics have a major position in compulsory school, and there is National assessment in these subjects at the end of the third (Swedish and mathematics), fifth and ninth grade (Eurydice 2008, SNAE 2009). Various measures have been taken to improve the achievement in mathematics and science as a consequence of national and international studies, and The Swedish National Agency for Education is working on new syllabuses for all subjects to be implemented in 2011. The new syllabuses will be more focused on specific factual knowledge with precise objectives for the learning outcome. The objectives, however, will not reduce the pedagogical freedom of the teachers (SNAE 2009).

In Sweden there has been a great focus on decentralization, not just to the municipality level; decision-making power is granted each and every school. The Swedish Democrats state that

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<sup>5</sup> Swedish National Agency for Education <http://www.skolverket.se/sb/d/493/a/1303> 08.03.09

they introduced decentralization policy as a means of improving democracy and efficiency, while others see it more as an adoption of neo-liberal policies (Daun 2003). Sweden also supports grant-aided schools, which can be seen as part of finance driven reforms and an answer to “how to pay for education?” Accountability to ensure quality education is enhanced by national and international tests. In the current documents, policymakers do not express the same concern for the knowledge society as the other countries, but have more emphasis on the democratic ideal. However, it seems like the new syllabuses will focus more on knowledge and that Sweden expresses the same ideals as the other countries (SNAE 2009).

## 4.6 Comparing the Countries' Education Systems

Decentralization has different meaning in different settings, so also for the five countries outlined above. From a Nordic perspective, with a history of highly centralized policy, Canada and Australia have always been regarded as decentralized due to their federal constitution with state/provincial/territory governments. Today, when decentralization is introduced in most countries, transfer of authority to state or territory level is not regarded as a highly decentralized system. The level of decentralization depends partly on the definition of centre and partly on the locus of decision-making. In Canada for example, if the provincial level is defined as the centre, the administration of education is a mix where the provincial government allocates authority to the school boards which again determine the scope of school autonomy within their board. Thus, there are many variations of decentralization policies within Canada. Australia is also a federation of states and territories, and even if school based management was implemented as early as the 1970s in some jurisdictions, the level of school autonomy varies based on how much authority the state or territory government delegates to their schools. Canada does not have a federal ministry of education, while Australia has a Department of Education and a Minister of Education. Both countries have a council consisting of educational ministers from all the states and territories that co-operate with the federal government and sets priorities for nationwide educational initiatives. The central government in Australia has increased its influence of the educational sector over the past decades, and the Council of educational ministers in both countries has recommended some common standards for their country's



educational system to achieve greater national consistency in curricular outcomes. Both the federal states are taking steps towards a centralized curriculum, or at least a framework of common standards for the whole nation, and started necessary processes to help states and territories achieve those standards (Lykins and Heyneman 2008).

In the Nordic countries, with an educational system historically based on centralized planning and steering, and a welfare state tradition which stresses equality in education, radical changes have taken place over the last couple of decades (Rinne et al. 2002). Now the municipalities play a prominent role as education providers, and they determine how much authority is delegated to schools. This results in a variety of transfer models between municipalities and schools within the country. The Nordic countries have kept their centralized curriculum, and assigned to each municipality to implement and adapt the curriculum to local conditions. In some municipalities, this responsibility is delegated to the schools, while in others the municipality authority is in charge. In Australia and Canada, curriculum is created at the state and territory level based on the existing framework for curriculum development, while adaptation to local conditions and implementation are usually delegated to school boards (Canada) and/or schools. Sweden seems to experience larger school autonomy than Finland and Norway, and of all the countries examined; only Sweden informs that teacher salary is typically set at the school level. Among other tasks, like organizing learning, determine teaching methods and school content, the level of school autonomy varies between the municipalities in the Nordic countries, and between the jurisdictions and school boards in Australia and Canada.

How the students' school achievement is measured varies between the countries. Finland stands out with no national tests, while the other countries have standardized testing within specific subjects during primary and secondary school. Mathematics and reading literacy apply for all four countries, Norway and Sweden test their students in English literacy, and Australia and Canada has national tests in science. In Norway and Sweden the tests are administered centrally, in Australia each state or territory are responsible for testing the students according to their Statements of Learning, and the Pan-Canadian Assessment Program (PCAP) complement existing assessment in each province and territory in Canada.

The five countries all recognize knowledge as the key to participate in the world market, and identify education as the foundation for the countries' future prosperity. Sweden has less focus on knowledge in their current curriculum and syllabuses, but new syllabuses with strong focus on competencies and knowledge are under construction. Knowledge and competencies in especially mathematics and literacy are emphasized, alongside science, and in the Nordic countries also English literacy. Lifelong learning is adapted by all five countries with the underlying rationale that this is a personal good as well as positive for the country.

Even though all countries now have a decentralized education system to some extent, and the market mechanism rule in the societies at large, public schools still remain the major provider of education. Australia has the largest share of students in non-public schools with about 1/3 of the student mass, but this is not a recent phenomenon; the church schools which hold most of these students predate the government schools. Sweden is fastest growing in this area with 8% of the students in grant-aided independent schools, while in Norway and Finland about 2% attend non-public schools.

## 5. Data and Methods

This chapter describes data from the PISA 2006 survey that I make use of in my analyses, alongside the methods employed in the search for a possible relationship between school autonomy and student performance. The first part examines the variables, how they are obtained and what they represent, while the second part reviews the statistical methods applied.

### 5.1 Variables of Interest

The variables elucidated in this section are the ones employed in relationship analyses to investigate whether the level of school autonomy affects student performance. The students' Science score in PISA 2006 is utilized as measure for student performance and represent the dependent variable, whereas the level of School Autonomy, the Economic, Social and Cultural Status (ESCS), and the Immigrant Background are the independent variables. The two latter is essential when controlling for factors already known to have an impact on student achievement. The variables for School Autonomy is calculated based on the responses given by the principals with reference to their school characteristics, while the other variables are the original ones obtained from the PISA 2006 dataset.

#### 5.1.1 Students' Achievement in Scientific Literacy

The use of the term “scientific literacy” in stead of “science” reflects the focus on the application of scientific knowledge in the context of life situations rather than reproduction of traditional school science knowledge (OECD 2006). PISA 2006 assessed students' ability to perform scientific tasks in a variety of situations, ranging from those affecting their personal lives to wider issues concerning the community or the world, from basic literacy skills through advanced knowledge of scientific concepts. These tasks measured students' performance in relation both to their science competencies and to their scientific knowledge. The science literacy assessment included questions at various levels; multiple choice questions, questions where students were required to create a response in their own words

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based on the text given, and questions where the students had to explain their results or to show their thought processes. The questions were typically presented in units, based on a single scientific problem described in a text, often with pictures, graphs or tables included to set out real-life situations (OECD 2007a).

Each student was awarded a score based on the difficulty of questions that he or she could reliably perform. The majority of the questions were dichotomously scored with credit or no credit, but some of the more complex multiple choice and open response items involved partial credit scoring (OECD 2006).<sup>6</sup> Student scores in science were grouped into six proficiency levels, where level 6 represents the highest scores, and thus the hardest tasks. Level one represents lowest scores, and thus the easiest tasks. The students' proficiency level was able to be measured by using the Rasch model as the basic model (OECD 2004, Kjærnsli et al. 2007)<sup>7</sup>. The score for each participating country was the average of all student scores in that country, and for between-school comparisons the average score for students within one school was the school's score. The science performance scale is constructed in such way that the average student score in OECD countries is 500 points, and the standard deviation equals 100 points (see Chapter 5.2.2) (OECD 2007a). In my analyses I make use of the average science score for each school and do not consider the proficiency levels.

### 5.1.2 Level of School Autonomy

The principal at each participating school in PISA answers a context questionnaire providing information about their school characteristic. Based on the principals' perception of locus of authority, the level of school autonomy is disclosed through two set of questions; Q11 and Q12 (Appendix B). In the forthcoming analysis the set of questions from Q11 represents the level of school autonomy, while Q12 will be applied to elucidate the findings from Q11. Q12

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<sup>6</sup> For a more detailed description of the scoring and comments on the science questions, see Annex A, Additional Science Units in *Assessing Scientific, Reading and Mathematical Literacy, A Framework for PISA 2006*. <http://www.oecd.org/dataoecd/63/35/37464175.pdf> 20.03.09

<sup>7</sup> A description of the Rasch model can be found in Kjærnsli et al. 2007:293-295.

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asks about the *influence* of certain bodies, ranging from Student groups to National education authority, regarding staffing, budgeting, curricular content and assessment. The distribution of answers from Q12 is briefly presented in Chapter 6.1.6. In Q11, the principals were asked to report which level of authority holds a considerable *responsibility* for staffing, budgeting and curricular decisions; twelve items all together (OECD 2005c). These twelve items are made into two constructs for further analysis; *Autemploy* represents the school's level of autonomy regarding employment and salary decisions for teachers, and *Autlearn* represents the school's autonomy level for items related to student learning. The level of authority are categorised into four groups in the questionnaire Q11; Principal/teachers; School governing board; Regional or local education authority and National education authority. To simplify the division between central and local level authority, the four categories are divided into two. Every decision made by those attached to the specific school, meaning the school staff and the School governing board, is regarded as local level authority, whilst decisions regarding more than one school are made by central level authority which includes Regional/local and National education authority (see Chapter 6.1.2). Canada is an exception; their school boards administer a group of schools within their board, but are still considered as local level authority in my analyses.

### 5.1.3 Economic, Social and Cultural Status (ESCS)

In the PISA study, the sampled students answer a context questionnaire providing information about themselves and their home background. A Questionnaire Expert Group, with members selected by the PISA Governing Board, provided leadership and guidance in the construction of the PISA context questionnaires (OECD 2007b). Usually the socio-economic status measures occupational status, education and wealth. In PISA, there was no direct measure of wealth because parents' income was not available for all countries. As an alternative the students reported their access to relevant household items. ESCS is then based on three sub-concepts; economic-, social- and cultural capital, which gives a measure of parents' occupation, home possessions and parents' highest education. The responses for occupation were coded in accordance with the International Standard Classification of

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Occupation<sup>8</sup>, and the highest level of educational attainment of the parents was converted into years of schooling using a conversion coefficient. Home possessions includes among other things a room of their own, a computer they can use for school work, classic literature, works of art, the number of cars, televisions, cellular phones, books at home, and some country specific items. The student score on this index are derived from a Principal Component Analysis standardised to have an OECD-mean of zero and a standard deviation of one (OECD 2007b).

#### 5.1.4 Immigrant Background

The immigrant background of the student is an additional measure for family background. In the PISA context questionnaire the students were asked if they, their mother and/or their father were born in the country of assessment or in another country. Responses were then grouped into three categories; Native students; Second generation students and First generation students. The native students are those students born in the country of assessment or who has at least one parent born in that country. Second generation students are born in the country of assessment, but their parents were born in another country, and first generation students are those students born outside the country of assessment and whose parents also were born in another country (OECD 2007b). In the forthcoming analysis there is no distinction between first and second generation students, they are grouped in a variable called *Immig*. The variable *Immig* represents the country's mean value, in percent, of foreign born students participating at each school.

## 5.2 Methods Applied

Correlation analysis and multiple regression analysis are the methods of choice when investigating a possible connection between school autonomy and student performance. Correlation measures the relationship between student performance and school autonomy, immigrant background and socio-economic status. Multiple regression is applied to predict

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<sup>8</sup> International Labour Organization: [www.ilo.org/public/english/bureau/stat/isco/index.htm](http://www.ilo.org/public/english/bureau/stat/isco/index.htm) 24.03.09

the contribution of each of the independent variables to student performance, and to observe whether a contribution still exists after controlling for family background. The two methods will be introduced in this section alongside a description on measures of variation and significance testing. Variation indicates the spread of a sample, illuminating the differences between schools in a country, and significance testing is applied as help to interpret the results from the relationship analyses. The statistical computer program SPSS is utilized as a tool for all the analyses, but before any analyses can be performed, how to deal with missing data has to be settled. Therefore, this chapter starts with a brief description on missing data.

### 5.2.1 Missing Data

When the results from a survey are assessed, the researcher has to decide how to treat missing data. Data is missing when a variable does not have valid values for all cases. Generally there are several reasons for missing values; respondent might refuse to answer certain question on a questionnaire or in an interview; the question does not apply to the respondent; the answer is illegible; two answers are circled when only one is required; errors in the coding or transcription of data (Miller et al. 2002). It is important to consider how to deal with missing values when performing statistical analysis. In SPSS there are different options regarding missing values, one is “Exclude cases listwise” which will include cases in the analysis only if they have full data on all of the variables for that case. Another one is “Exclude cases pairwise” which excludes the case only if they are missing the data required for the specific analysis. Yet another is “Replace with mean” which calculates the mean value for the variable and gives every missing case this value (Pallant 2007). It is also possible to replace the missing values by the mean scores of all valid answers given by the relevant case, or to combine the two solutions. The exclusion or replacement of missing values can be done as a first step of the analysis work and be applicable for all forthcoming analyses, or it can be done for certain analysis when they are performed and the option to choose how to deal with missing values is available. The missing data for the variables employed in these analyses is minor and with negligible impact on the results, thus no specific action is taken except for choosing the “Exclude cases pairwise” option when SPSS requires a choice to be made.

### 5.2.2 Variance, Standard Deviation and Standardization

Standard deviation and variance are the most common measures for the variation in a sample. They are both measures of the dispersion around the mean, indicating how spread out a distribution is. The variance is computed as the average squared deviation from the mean, while the standard deviation is the square root of the variance. Standard deviation has the same units as the original variable; hence it is easier to interpret and is often used as the measure of spread (Miller et al. 2002, Kjærnsli et al. 2007).

In a normal distribution, which indicates a symmetric dispersion around the mean, about 95% of the cases are covered within two standard deviations from the mean. It is common to standardize the measured variables and express the results in number of standard deviations from the mean. The mean is set as 0 and the standard deviation as 1 (Kjærnsli et al. 2007). In PISA this standardization has been done for most of the constructs, including the Economic-, Social- and Cultural Status variable which is relevant for this study (see Chapter 5.1.3). The standardized values do not say anything directly about how the students have answered the questions. They are meaningful only for comparison purposes and disclose how students have answered the questions compared to other students (Kjærnsli et al. 2007). The Science scores in PISA are standardized in another way. All the OECD countries contributed equally when the mean score for all the students was calculated and standardized to 500 and the standard deviation to 100. The non-OECD countries were not considered in this calculation, and the mean score is referred to as OECD-mean (OECD 2007b). In this thesis the students are not compared individually, but the schools holding sampled students are compared. Within a country each school represents one case, and the score for the school is the average score of the sampled students in this school. The standard deviation expresses how far from average one score is, and within each country the standard deviation depends on the dispersion among the country's schools. Large variation in results between schools within a country increases the standard deviation. The average score for all the sampled schools within the country represents the country's score, and one country is compared to another country both by mean scores and by standard deviation.



### 5.2.3 Correlation

Pearson correlation is essential in the analyses performed in this thesis. This method is employed when examining the hypothesis about the existence of a relationship between-school autonomy and students' school achievement. The alleged relationship between family background and performance at school is also analysed by applying Pearson's correlation. If there exists a relationship between two variables, a correlation analysis determines the strength and direction of this relationship. It has to be stressed that this is statistical relationships that do not explain cause-effect relationships. An apparently strong relationship between variables may originate from various sources, including the influence of other, unmeasured variables (Tabachnick and Fidell 2001). There are different techniques available, but Pearson correlation coefficient ( $r$ ) is often applied to explore the relationship between two continuous variables. Pearson correlation coefficient can only take on values between -1 and +1. The value gives an indication of the strength of the relationship, with  $\pm 1$  as the perfect relationship between two variables, and 0 as no relationship at all between the two variables. The  $\pm$  sign indicates the direction of the relationship, whether there is a positive or negative relationship between the two variables. A positive correlation indicates that if one of the variables increases, so does the other. A negative correlation indicates an increase in one of the variables while the other one decreases (Pallant 2007). If the value of Pearson's  $r$  is squared, the derived measure is the coefficient of determination,  $R^2$ .  $R^2$  can be presented in percent and expresses how much the variance in one variable co-varies with the other variable (Tabachnick and Fidell 2001).

### 5.2.4 Multiple Regression

Multiple regression is a more sophisticated extension of correlation and explores the relationship between a set of independent variables and one dependent variable. In this study, multiple regression is applied to investigate a possible contribution of school autonomy to student performance (dependent variable) and at the same time control for the influence from socio-economic status and immigrant background. Multiple regression tells how much of the variance in the dependent variable can be explained by the independent variables, or phrased differently, how well a set of variables is able to predict a particular outcome. A calculation of the relative contribution of each independent variable is also

provided, revealing how much variance each of the independent variables explains in the dependent variable over and above the other independent variables in the set (Tabachnick and Fidell 2001). In addition, this method will test whether a particular independent variable is still able to predict an outcome when the effect of another variable is controlled for (Pallant 2007). This makes it possible to explore the unique contribution for each of the independent variables to the students' science score, and to figure out if one particular variable is a better predictor for the outcome than the others. Multiple regression then provides the opportunity to test whether a possible contribution to the difference in school performance predicted by school autonomy still exists after controlling for the students' family background.

When comparing the regression coefficients obtained from multiple regression, it is important to use the standardized coefficient which is named beta. The beta values, for each of the variables, have been converted to the same scale to make them equivalent and comparable. The values for the standardized coefficients are between 0 and  $\pm 1$ , the closer to  $\pm 1$  the more significant contribution. Just like Pearson's correlation coefficient, the regression coefficients can only ascertain relationship between variables, but never explain underlying causal mechanisms (Tabachnick and Fidell 2001). For small sample sizes, multiple regression is not preferable, but this is not a dilemma for my study. There are different opinions among researcher about the number of cases needed to obtain a result that can be generalised to other samples, but a guideline is 15-20 times as many cases as variables to make a reliable equation (Pallant 2007).

### 5.2.5 Statistical Significance

A result is called statistically significant if it is unlikely to have occurred by chance. In a correlation analysis, a statistically significant correlation simply means there is statistical evidence of a relationship between the variables involved; it does not necessarily mean a strong relationship, important, or significant in the common meaning of the word. To test the significance for a hypothesis, a significance level is set. In most social research, including the PISA survey, the significance level is set to 0.05, meaning that the probability for the results to have occurred by chance is 5 times out of every 100. A significant result at the

0.05 level means at least 95% certainty that the hypothesis is true for the whole population. The lower the significance level the stronger the evidence (Miller et al. 2002).

With a large sample size, very weak correlations can be found to be statistically significant, and vice versa; a small sample size need a strong relationship between the variables to get a statistical significant result. This is something that needs to be considered when comparing the five countries chosen for this paper due to the big differences in number of cases ranging from 155 in Finland to 896 in Canada.

## 6. Analyses and Results

The objective for the first section of this chapter is to create variables expressing the schools' autonomy level and then assess these alongside the other variables introduced in the previous chapter. In the second section, these variables will be applied in correlation and multiple regression analyses to investigate whether the level of school-autonomy affects student performance. All the variables are treated as continuous variables, and the statistical computer program SPSS is utilized for the analysis work.

### 6.1 Assessing the Variables

#### 6.1.1 Introduction

Some of the variables in this paper are directly imported from the PISA 2006 dataset, while others are recalculated and transformed into new constructs. The latter concern the variables measuring the countries' level of school autonomy. These variables are calculated based on the responses given by the school principals in the questionnaire Q11, with reference to their school characteristics (Appendix B). The creation of these autonomy variables will be demonstrated in this chapter, followed by a description of between-countries and within-countries variation for the autonomy variables, student achievement and family background. Within-country variation expresses the spread of the score between the countries' schools and not between each of the students. The first and the last sub-section demonstrate the distribution of authority within the educational system in Australia, Canada, Finland, Norway and Sweden, based on the principals' answer in the two sets of questions; Q11 and Q12 (Appendix B). In the first sub-section, Q11 reports which level of authority mainly *responsible* for a set of items regarding education, and this is the basis for the autonomy variable employed in the forthcoming analyses. In the last sub-section, the second set of school autonomy questions, Q12, describes which bodies that exert direct *influence* on decision- making in school. This second set of questions is utilized to illuminate and support the findings in Q11.

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### 6.1.2 Level of Authority

In Q11, one of the two sets of questions regarding school autonomy, the principals were asked to report which level of authority holds a considerable *responsibility* for staffing, budgeting and curricular decisions, twelve items all together. It is worth highlighting that this is the perception of only one person, which brings about some uncertainty with reference to the credibility of the answers. For each of the twelve items four boxes can be ticked, one for each authority level; Principal/teachers; School governing board; Regional/local education authority and National education authority. The answers are coded *Yes*=1 for those ticked and *No*=2 if not ticked. When running a frequency analysis, I found that surprisingly many had ticked for all the four authority levels for some items. 275 had not ticked any of the four boxes, but was still registered initially as *No*=2 instead of missing. This makes up for about 1% of all the answers, and will from now on be treated as missing values. The four authority levels from Q11 were divided into two groups in order to distinguish between central and local level authority. Every decision made by those attached to the specific school, meaning the school staff or the school governing board, is regarded as Local level authority, whilst decisions regarding more than one school are made by Central level authority.

Regional/local education authority and National education authority = Central level authority.

Principal/teachers and School governing board = Local level authority.

The responses from the principals were recoded so that 1 equals Central level authority and 3 equals Local level authority (Appendix C). Since many of the respondents have ticked for alternatives representing both central and local level authority, the label Mixed level authority is introduced to cover these combinations. Mixed level authority is recoded into 2. Then a range from 1 to 3 can be presented, where 3 represents the highest level of local autonomy (from now on called school autonomy), decreasing with lower values to 1 which represents the lowest level of local autonomy.

The level of authority for each of the 12 items in Q11 is calculated for the five countries in order to illustrate the school autonomy level for each item (Figure 6.1).

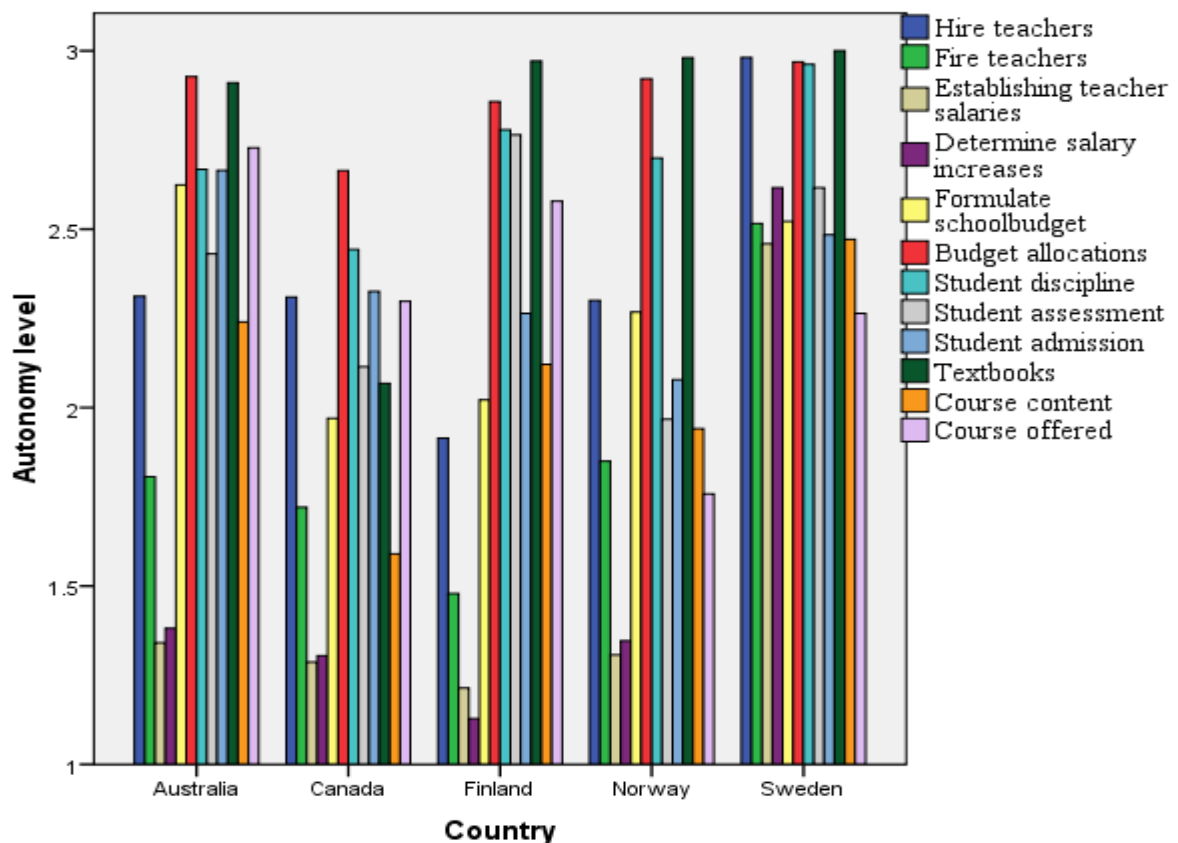


Figure 6.1 Autonomy Level

1 represents Central level Authority: Regional and National education authority  
 3 represents Local level authority: Principal/Teachers and School board

### 6.1.3 Creating New Variables for School Autonomy

The set of questions at which the level of school autonomy is based, Q11, contains twelve items. I would like to have less than twelve items to characterize school autonomy, thus I have performed a factor analysis to look for related items that can be merged into constructs forming new variables for school autonomy. Factor analysis reduces a large set of variables or scale items down to a smaller number of factors. The underlying patterns of correlation is summarised, and groups of closely related items are identified (Pallant 2007). This technique is often used when developing scales and measures. To get an idea of how the factors differ from each other, and to find out which item loads for which factor, the factors need to be rotated. I make use of the Varimax rotation method which attempts to maximize the variance of factor loadings by making high loadings higher and low ones lower for each factor (Tabachnick & Fidell 2001, Miller et al. 2002). If there are any missing values, meaning that

a variable does not have valid values for all cases, the option “Exclude cases pairwise” is employed to exclude the case only if they are missing data required for the specific analysis (see Chapter 5.2.1).

**Table 6.1 Factor Analysis**  
Rotated Component Matrix<sup>a</sup>

|                               | Component |      |
|-------------------------------|-----------|------|
|                               | 1         | 2    |
| Hire teachers                 | .685      |      |
| Fire teachers                 | .770      |      |
| Establishing teacher salaries | .849      |      |
| Determine salary increases    | .859      |      |
| Formulate schoolbudget        | .395      | .512 |
| Budget allocations            |           | .489 |
| Student discipline            |           | .629 |
| Student assessment            |           | .629 |
| Student admission             |           | .459 |
| Textbooks                     |           | .700 |
| Course content                |           | .624 |
| Course offered                |           | .574 |

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Table 6.1 shows the rotated factors for all the five countries together. Two components emerge; the four first items distribute into one component and the last seven items into another one, while Formulate school budget loads for both. When running all the countries together like this, the influence from each country will vary with the number of valid cases in the country. Canada with 830 valid cases for this analysis will have more influence on the result than Finland with 140 valid cases. However, this bias will not have an impact when performing factor analysis for each country separately (Appendix D).

The factor analysis for the five countries one by one shows that the four first items form one component for both Australia and Canada, while Formulate Schoolbudget loads for both components (Appendix D). For Australia, Student Admission loads for both components with quite similar weight, and for Canada, Course content loads for both components. For Finland the four first items makes one component together with Formulate budget, while Student admission and Course content loads for both components. Norway also gets the first four items in one component, but here both Formulate and Allocate budget load for this

component as well, together with Student admission. Student admission shows ambiguous results, and I have to run supplementary analyses to make sure whether this item can be included in a construct or not. Norway shows a different pattern than the other countries so far, in addition neither Student Discipline nor Textbooks load for any of the components. For Sweden, Textbooks have zero variance (100% school autonomy), and in order to get some result I had to remove Textbooks and run the analysis over again. The two first items, Hire and Fire teachers, load with a much lower number for Sweden than for the other countries, in addition both Formulate and Allocate budget load for the first component like Norway. Also like Norway, Sweden has no loading for Student Discipline.

For all five countries the first four items, which contain questions about teachers' employment and salaries, load for the same factor. These four items are therefore transformed into one variable called *Autemploy*. This variable reflects the level of school autonomy regarding hiring and firing of teachers, establishing teachers' salaries and determining salary increases. I will also try to make one construct out of the second component in the factor analysis, the items regarding student learning. In so doing the reliability of the possible constructs need to be established.

#### 6.1.4 Reliability Analysis for the School Autonomy Variables

To make sure the new constructs suggested in the factor analysis are consistent, the reliability in form of internal consistency has to be assessed. This is the extent to which the items included in the construct are all measuring the same underlying attribute. The most commonly used method is Cronbach's alpha which provides an indication of the average correlation among all of the items in the construct. The values range from 0 to 1, with 1 indicating the highest reliability. A minimum level of 0.7 is recommended, depending on the purpose of the construct. Cronbach's alpha values vary with number of items in the construct, the fewer items the lower value (Pallant 2007).

In addition to the reliability of a construct, the validity also needs to be considered. Reliability and validity are analytically distinguishable, but they are related because validity presumes reliability. The validity of a construct refers to the degree to which the construct



really measures what it is suppose to measure, but if there is no internal reliability, it is impossible to know what is measured (Bryman 2004). Furthermore, a construct need to be defined properly and labelled in a way that makes no room for misunderstanding about what it communicates.

The PISA study operates with a construct called Resource Autonomy which includes Formulating budget and Budget allocation in addition to the four items in *Autemploy* (hiring and firing of teachers, establishing teachers' salaries and determining salary increases) (OECD 2007b). The factor analysis shows ambiguous results for the two budget items for the different countries, and when assessing the reliability by using Cronbach's Alpha on both *Autemploy* and *Autemploy* together with Formulating and Allocating budget, I find that Sweden will get a considerable higher reliability by including the two budget items, respectively 0.51 and 0.63, while the other countries will get lower reliability (Table 6.2). Cronbach's alpha vary with number of items in the construct, the fewer items the lower value, and here the construct with the lowest number of items gets the highest reliability in four out of five countries. Thus I choose to keep *Autemploy* as a construct and not include the two budget items. The low reliability for Sweden has to be considered when discussing and comparing results from analyses including the variable *Autemploy*.

Table 6.2 Reliability Analysis for *Autemploy*

| Reliability (Cronbach's Alpha) |                  |  |
|--------------------------------|------------------|--|
|                                | <i>Autemploy</i> | <i>Autemploy +<br/>Formulating/Allocating<br/>Budget</i> |
| Australia                      | 0,82             | 0,76   |
| Canada                         | 0,80             | 0,76   |
| Finland                        | 0,71             | 0,64   |
| Norway                         | 0,75             | 0,72   |
| Sweden                         | 0,51             | 0,63   |

*Autemploy*: Hiring and Firing of Teachers, Establishing Teacher Salaries and Determining Salary Increases

From the set of questions regarding school autonomy (Q11), 4 out of 12 items are now occupied in the construct *Autemploy*. I tried out different combinations of the remaining items to make a decision about which items to include in a construct concerning student learning. The factor analysis suggests a second construct, but there is some ambiguity

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between the countries regarding which items to include in a second construct. Overall the combination best suited based on reliability analysis is attained when merging the 6 last items exclusive the item Student admission. The new construct will be called *Autlearn* and consists of the items Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered. The label *Autlearn* is chosen because this construct reflects the school autonomy level for items all having an impact on student learning.

Looking at the factor analysis for each country (Appendix D), Student admission was the most unpredictable item, thus the result suggesting exclusion is not unexpected. When including Student admission to the construct *Autlearn*, the reliability will increase slightly for Australia and Canada, more considerable for Finland (0.47→0.56) while Sweden and especially Norway (0.47→0.37) get lower reliability (Table 6.3). The low reliability measure for Norway shows that the internal consistency for *Autlearn* + *Student Admission* is too unpredictable for this country, and by choosing this alternative, Norway would be excluded from further analysis which involves this construct.

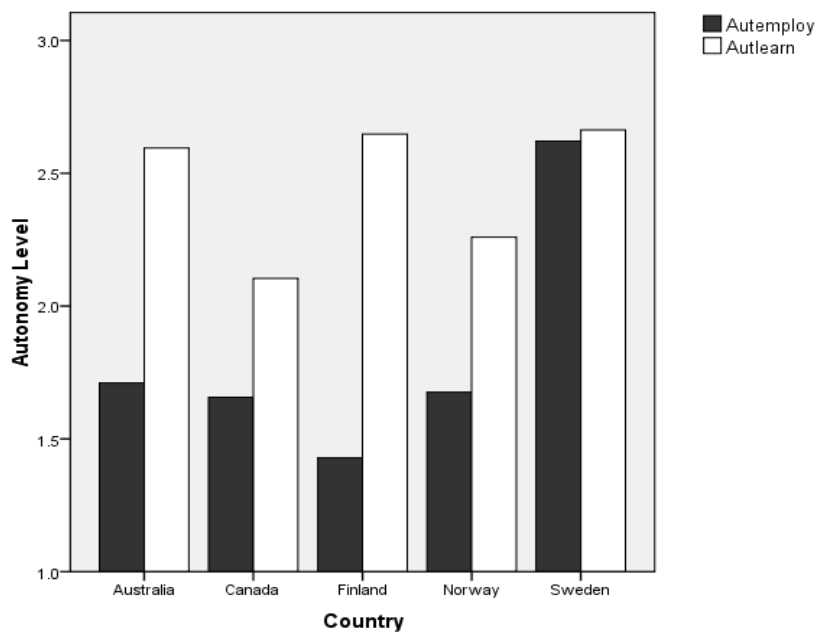
In the PISA analyses, a variable called *Curricular autonomy* is employed, covering the same items as *Autlearn* except Student Discipline. When assessing the reliability for *Curricular autonomy* to see whether this construct demonstrates higher reliability than *Autlearn*, I found that Australia, Canada and Finland express lower reliability for *Curricular autonomy*, while Norway (0.47→0.49) and Sweden (0.60→0.66) show a slightly increased reliability compared to *Autlearn* (Table 6.3). This supports the decision to keep *Autlearn* as the variable expressing the school's autonomy level regarding student learning.

The two budget items, Formulate Schoolbudget and Budget allocation, load for different components in the factor analysis, and when assessing the reliability for constructs including the budget items, Norway attain a very low reliability (0.36), hence, this combination of items is rejected (Table 6.3). Even though the reliability for *Autlearn* is below 0.7, which is the recommended value (Pallant 2007), *Autlearn* is kept as a second construct based on the factor analysis which suggests a second construct and the reliability analysis where *Autlearn* is the combination of items with the best reliability all together. Finland and Norway are the two countries with lowest reliability for this construct (0.47), something that need to be considered when results from analyses involving *Autlearn* are discussed.

Table 6.3 Reliability Analysis for *Autlearn*

|           | Reliability (Cronbach's Alpha) |                            |                            |                               |
|-----------|--------------------------------|----------------------------|----------------------------|-------------------------------|
|           | <i>Autlearn</i>                | <i>Autlearn + Stud.adm</i> | <i>Curricular Autonomy</i> | <i>Including budget items</i> |
| Australia | 0.63                           | 0,67                       | 0,53                       | 0,71                          |
| Canada    | 0.66                           | 0,70                       | 0,61                       | 0,73                          |
| Finland   | 0.47                           | 0,56                       | 0,45                       | 0,56                          |
| Norway    | 0.47                           | 0,37                       | 0,49                       | 0,36                          |
| Sweden    | 0.60                           | 0,55                       | 0,66                       | 0,54                          |

*Autlearn*: Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered (5 items).  
*Autlearn + Stud adm*: Student Discipline, Student Assessment, Textbooks, Course Content, Course Offered and Student Admission (6 items).  
*Curricular Autonomy*: Student Assessment, Textbooks, Course Content and Course Offered (4 items).  
*Including budget items*: Formulating Budget, Budget Allocation, Student Discipline, Student Assessment, Textbooks, Course Content, Course Offered and Student Admission (8 items).

Figure 6.2 Autonomy Level for *Autemploy* and *Autlearn*

*Autemploy*; Hiring and Firing of Teachers, Establishing Teacher Salaries and Determining Salary Increases.

*Autlearn*; Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered.

1 represents Central level Authority: Regional and National education authority

3 represents Local level authority: Principal/Teachers and School board

Figure 6.2 illustrates the autonomy level for the two variables representing school autonomy, *Autemploy* and *Autlearn*. In the figure, 3 represents the highest level of school autonomy, decreasing with lower values to 1 which represents central level authority, hence the lowest level of school autonomy. All the countries, except Sweden, have considerably higher level of school autonomy for student learning than for teacher employment and salaries. Sweden stands out from the rest with equally high level of school autonomy for both variables. Features of the two school autonomy variables are further elucidated in the following sub-chapter.

### 6.1.5 Between-Countries and Within-Countries Variation for the Variables

In this chapter the mean score and the spread of the score for all the variables utilized are examined for each of the countries, followed by a comparison between the countries' score. The measures needed for these tasks are listed in Table 6.4.

Table 6.4 Variables

|           | <i>Science score</i> |         |            |    | <i>Autemploy</i> |         |                |      | <i>Autlearn</i> |         |                |      |
|-----------|----------------------|---------|------------|----|------------------|---------|----------------|------|-----------------|---------|----------------|------|
|           | Valid cases          | Missing | Mean score | SD | Valid cases      | Missing | Autonomy level | SD   | Valid cases     | Missing | Autonomy level | SD   |
| Australia | 356                  | 0       | 521        | 50 | 346              | 10      | 1.71           | 0.65 | 355             | 1       | 2.59           | 0.33 |
| Canada    | 896                  | 0       | 519        | 51 | 846              | 50      | 1.66           | 0.57 | 852             | 44      | 2.11           | 0.43 |
| Finland   | 155                  | 0       | 563        | 27 | 146              | 9       | 1.42           | 0.47 | 152             | 3       | 2.64           | 0.31 |
| Norway    | 203                  | 0       | 489        | 38 | 175              | 28      | 1.67           | 0.59 | 190             | 13      | 2.26           | 0.39 |
| Sweden    | 197                  | 0       | 505        | 41 | 189              | 8       | 2.61           | 0.41 | 186             | 11      | 2.66           | 0.32 |

|           | <i>ESCS</i><br><i>Economic- Social- Cultural Status</i> |         |      |      | <i>Immig</i><br><i>Immigrant background</i> |         |       |       |
|-----------|---|---------|------|------|---|---------|-------|-------|
|           | Valid cases   | Missing | Mean | SD   | Valid cases                                 | Missing | Mean  | SD    |
| Australia | 356   | 0       | 0.16 | 0.41 | 356   | 0       | 19.23 | 19.31 |
| Canada    | 896   | 0       | 0.26 | 0.43 | 896   | 0       | 12.75 | 20.45 |
| Finland   | 155   | 0       | 0.26 | 0.28 | 155   | 0       | 1.55  | 3.44  |
| Norway    | 203   | 0       | 0.41 | 0.33 | 203   | 0       | 6.24  | 10.41 |
| Sweden    | 197   | 0       | 0.24 | 0.39 | 197   | 0       | 12.42 | 18.01 |

Valid cases: Number of schools applicable for the variable  
*Autemploy*; Hiring and Firing of Teachers, Establishing Teacher Salaries and Determining Salary Increases.  
*Autlearn*; Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered.

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The first column in Table 6.4 is labelled “Valid cases”. This represents the number of schools applicable for the variable after the missing data is eliminated. For the listed variables only *Autemploy* and *Autlearn* have some missing data, the other variables have valid values for all the cases. Here, each case represents one school, and the variables with missing data are the ones created from the school autonomy questionnaire answered by the principal. The numbers of missing values are minor, and nothing is done to the missing values except for using the “Exclude cases pairwise” option in SPSS when this alternative is available (see Chapter 5.2.1).

For the variable representing the students’ achievements, *Science score*, the average student score in OECD countries is 500 points, and one standard deviation equals 100 points (see Chapter 5.2.2). Finland has the highest performing students of all, followed by Australia and Canada, both well above the OECD-mean. Sweden is within the OECD-mean while Norway has the lowest achievement score of the five countries. The mean score calculated and presented here differs slightly from the mean score in official PISA documents (Appendix A). This is because the data from the PISA survey is weighted while I treat all the cases as equal without any weighting (see Chapter 3.3.3). Another discrepancy relates to the standard deviation; in most tables presenting achievement score from PISA, the standard deviation reflects the dispersion of scores between the students and not between the schools as in this study (Appendix A). When comparing these two, the between-student variance is considerably larger than between-school variance for *Science score* within a country, demonstrating that there are bigger differences in achievement between the students than between the schools. Finland, with the highest science score, also has the lowest between-school difference, indicating that all schools in Finland have high performing students. The largest spread of scores between the schools is found in Australia and Canada.

The next variables in Table 6.4 are those representing the level of school autonomy. Sweden has a different pattern than the other countries with a higher level of local autonomy for *Autemploy*. This indicates that the responsibility regarding teacher employment and salary decisions lies within the local level authority in Sweden, whilst the central level authority holds more responsibility in the other countries. When looking at the autonomy level for the variable *Autlearn*, which contains items related to student learning, the local level has high degree of autonomy in all countries compared to *Autemploy*. Also for this construct Sweden

has the highest level of local autonomy, closely followed by Finland and Australia with Norway somewhat lower and Canada with a mean value close to 2, suggesting a mixed level of authority (central and local level equally responsible). The standard deviation for the two school autonomy variables expresses a large dispersion between the schools within each country, especially for *Autemploy*. Australia is the country with the biggest differences between their schools for *Autemploy*, followed by Norway and Canada. For *Autlearn* all the countries have lower within-country variance. Canada, closely followed by Norway, has the largest spread, while the others express somewhat lower dispersion.

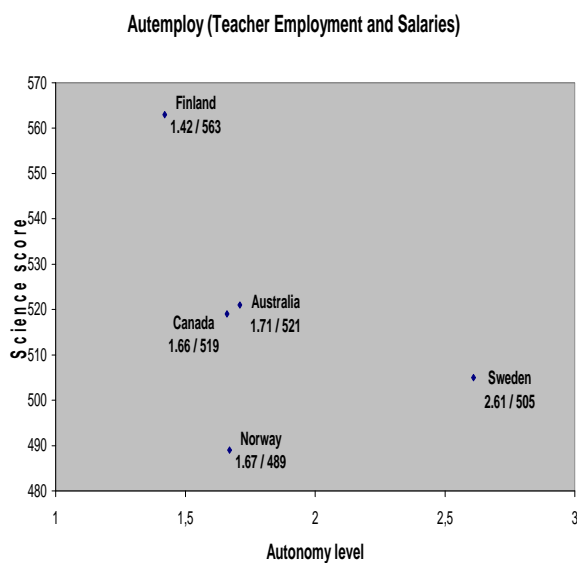


Figure 6.3  
Autonomy Level/Science Score for *Autemploy*

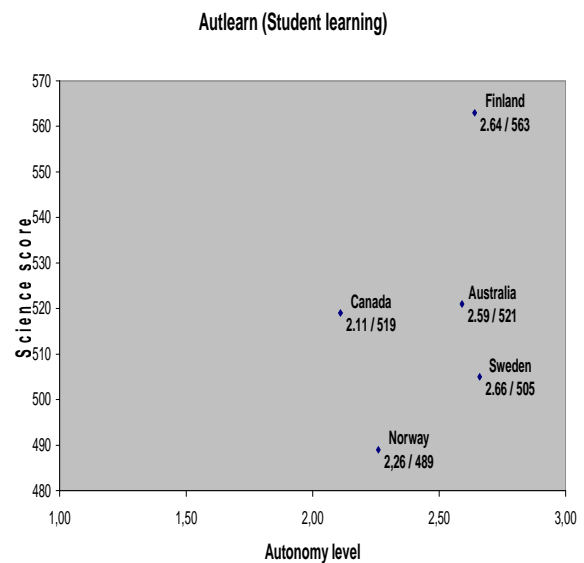


Figure 6.4  
Autonomy Level/Science Score for *Autlearn*

The two figures, Figure 6.3 and Figure 6.4, visualize the relation between the autonomy level for respectively *Autemploy* and *Autlearn*, and student achievement for each of the five countries. As mention above, Sweden has the highest level of local autonomy, but is not among the top performing countries for science achievement. Finland, with the highest achieving students of all in the PISA 2006 survey, has the lowest autonomy level of the five countries regarding teacher employment and salaries, while the autonomy level related to student learning is equal to Sweden. The two figures do not disclose any pattern for a relationship between level of local autonomy and student achievement.

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In Table 6.4, the mean value for the variable *ESCS*, which expresses the economic-, cultural- and social status, shows that Norway has the highest score, thus the most advantageous family background. Australia has the lowest score and the three remaining countries' scores are clustered in the middle. Australia, Canada and Sweden have the biggest spread for this variable, Finland the lowest. In the PISA 2006 data set, the scores for *ESCS* is standardised to have an OECD-mean of zero and a standard deviation of one (see Chapters 5.1.3 and 5.2.2). This standard deviation reflects the dispersion of scores between students, while in Table 6.4 the dispersion between schools is presented. All the five countries express a much lower between-school difference than the standardized value for between-student difference for socio-economic status.

Immigrant background is the other variable reflecting the students' family background (see Chapter 5.1.4). The variable *Immig* represents the mean value, in percent, of foreign born students enrolled at each school (Table 6.4). The OECD-average is 14.4% (OECD 2007b). Australia has the largest number of students with immigrant background (19.23 %), Finland the lowest number (1.55%). The three Nordic countries differ greatly in numbers of foreign born students, Sweden (12.42%) has approximately the same number as Canada, twice as many as Norway, and almost tenfold of Finland. For *Immig*, as for *ESCS*, Finland has the lowest dispersion between their schools, while Australia, Canada and Sweden have large between-school differences. Looking at the two variables representing family background, Sweden with large dispersion both for socio-economic status and immigrant background is more comparable to Canada and Australia than the other two Nordic countries.

### 6.1.6 A Presentation of the Second Set of School Autonomy Questions (Q12)

The second set of school autonomy questions, Q12, asks about the *influence* of certain bodies, ranging from Student groups to National education authority, regarding staffing, budgeting, curricular content and assessment practices. One person, mainly the principal, at each sampled school answers the questions based on his/hers perception, which again brings about some ambiguity with reference to the credibility of the answers. The frequency tables below (Table 6.5a-6.5d) illustrate the distribution of the responses. Regional or Central authority represents central level authority together with the External examination boards,

while School boards together with Parent-, Teacher- and Student groups indicate local level authority. These results will be utilized in the discussion part with the intention of illuminating and presumably support the findings in Q11 (the first set of school autonomy questions) regarding the school autonomy level.

**Table 6.5a Influence on Staffing**

|           | Regional or Central Authority | School Governing Board | Parent Groups | Teacher Groups | Student Groups | External Examination Boards |
|-----------|-------------------------------|------------------------|---------------|----------------|----------------|-----------------------------|
| Australia | 64%                           | 22%                    | 6%            | 40%            | 2%             | 2%                          |
| Canada    | 48%                           | 49%                    | 7%            | 27%            | 2%             | 2%                          |
| Finland   | 43%                           | 24%                    | 1%            | 36%            | 3%             | 1%                          |
| Norway    | 17%                           | 7%                     | 0%            | 34%            | 0%             | 0%                          |
| Sweden    | 7%                            | 13%                    | 4%            | 73%            | 17%            | 0%                          |

When looking at the frequency tables for staffing (Table 6.5a), Australia is influenced by central level authority together with Canada and Finland, whilst this authority level has almost no influence on staffing in Sweden, and the response for Norway is also low. Teacher groups are another authority level worth noticing on the matter of staffing; 73 % of the principals in Sweden report that teachers have an influence on staffing, whereas the other countries report 35-40% influence from teacher groups. Canada has somewhat lower response for the teacher groups than the other countries, while here the school governing board has more influence on staffing than in the other countries.

**Table 6.5b Influence on Budgeting**

|           | Regional or Central Authority | School Governing Board | Parent Groups | Teacher Groups | Student Groups | External Examination Boards |
|-----------|-------------------------------|------------------------|---------------|----------------|----------------|-----------------------------|
| Australia | 60%                           | 71%                    | 24%           | 42%            | 8%             | 2%                          |
| Canada    | 70%                           | 70%                    | 20%           | 22%            | 7%             | 2%                          |
| Finland   | 54%                           | 34%                    | 3%            | 32%            | 5%             | 1%                          |
| Norway    | 30%                           | 57%                    | 12%           | 46%            | 12%            | 2%                          |
| Sweden    | 9%                            | 35%                    | 4%            | 64%            | 8%             | 0%                          |

For Australia and Canada, central level authority and the school governing board both have a huge influence on budgeting (Table 6.5b). School governing board is defined as local level



authority in my study, so these results for Australia and Canada show that both the local and the central level have great influence on the Schoolbudget. Australia is less influenced by the regional level than Canada, showing quite high response for teacher groups in addition to the school board. Of the three Nordic countries, Finland is the country most influenced by central level, while Sweden and Norway have highest response for teacher groups and school governing board. The central level authority has very little influence on the budgeting in Sweden, only reported by 9% of the principals.

Table 6.5c Influence on Instructional Content

|           | Regional or<br>Central<br>Authority | School<br>Governing<br>Board | Parent<br>Groups | Teacher<br>Groups | Student<br>Groups | External<br>Examination<br>Boards |
|-----------|-------------------------------------|------------------------------|------------------|-------------------|-------------------|-----------------------------------|
| Australia | 78%                                 | 11%                          | 12%              | 71%               | 16%               | 66%                               |
| Canada    | 91%                                 | 24%                          | 11%              | 58%               | 9%                | 21%                               |
| Finland   | 87%                                 | 27%                          | 39%              | 87%               | 37%               | 11%                               |
| Norway    | 82%                                 | 4%                           | 6%               | 62%               | 19%               | 4%                                |
| Sweden    | 46%                                 | 8%                           | 17%              | 80%               | 70%               | 1%                                |

The instructional content is highly influenced by central level authority in all countries, with Sweden considerably lower than the others (Table 6.5c). At the same time teacher groups are reported to have large influence in all the countries, so both central and local level are influencing instructional content. Sweden differs from the other countries with a high level of influence from student groups, although Finland is also quite influenced by student groups, but not to the same extent as in Sweden. Finland is the only country with considerable influence from parent groups, while Australia is the only country where instructional content is largely influenced by examination boards.

As for instructional content, external examination boards have an extensive influence on assessment practice in Australia (Table 6.5d). Canada is also influenced by external examination boards when it comes to assessment practice, and to a smaller extent; Finland and Norway. All the five countries are heavily influenced by central authority and teacher groups, both central and local level authority. In Norway, 25% of the principals report that student groups have an influence on the assessment practice, and in Finland parents groups are reported to have an influence in 25% of the cases. Student groups and parent groups have little influence in the other countries.

Table 6.5d Influence on Assessment Practice

|           | Regional or<br>Central<br>Authority | School<br>Governing<br>Board | Parent<br>Groups | Teacher<br>Groups | Student<br>Groups | External<br>Examination<br>Boards |
|-----------|-------------------------------------|------------------------------|------------------|-------------------|-------------------|-----------------------------------|
| Australia | 83%                                 | 12%                          | 13%              | 73%               | 14%               | 76%                               |
| Canada    | 77%                                 | 29%                          | 10%              | 64%               | 9%                | 41%                               |
| Finland   | 83%                                 | 22%                          | 25%              | 74%               | 14%               | 23%                               |
| Norway    | 62%                                 | 4%                           | 11%              | 80%               | 25%               | 21%                               |
| Sweden    | 50%                                 | 2%                           | 4%               | 76%               | 13%               | 3%                                |

For all the four categories; staffing, budgeting, curricular content and assessment, Sweden is the country with highest level of local influence. The most influential body in Sweden is the teacher groups, and for instructional content also the student groups. Canada is the country most influenced by school governing boards, and least by teacher groups. In all four categories, with a lower response for staffing, the central level authority has a large influence in Canada. Australia is also heavily influenced by the central level authority, but at the same time the teacher groups are reported to have a big influence. External examination boards are far more influential in Australia regarding instructional content and assessment than in any of the other countries. Finland is in the middle, more influenced by central level authority than Norway and Sweden, but less than Australia and Canada. The teacher groups in Finland are about as influential as they are in Australia and Norway.

In the following part, the variables representing school autonomy, family background and student achievement are employed in correlation and multiple regression analyses to investigate a potential relationship between school autonomy and student performance.

## 6.2 Analyses of Relationship between Student Achievement and School Autonomy

The analyses in this section are performed to investigate whether level of school autonomy affects student performance. First, all the variables are applied in a correlation analysis to test the relationship between *Science score* and each of the variables *Autemploy*, *Autlearn*, *ESCS* and *Immig*. The next analysis employed is multiple regression. Here, the contribution of each of the independent variables (*Autemploy*, *Autlearn*, *ESCS* and *Immig*) to the variance

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in the dependent variable (*Science score*) is tested, followed by an analysis that calculates the contribution of the school autonomy variables when the effect from socio-economic status (*ESCS*) and immigrant background (*Immig*) are controlled for. It is important to remember that both correlation and multiple regression analyses present statistical relationships and do not explain cause-effect relationships. Additionally, it should be kept in mind that Sweden has low reliability for the construct *Autemploy*, while Finland and Norway express low reliability for *Autlearn*. This makes results calculated from these constructs somewhat unpredictable for the concerning country.

### 6.2.1 Correlation Analysis

Pearson correlation coefficient ( $r$ ) is the technique of choice when looking for a relationship between *Science score* and each of the variables *Autemploy*, *Autlearn*, *ESCS* and *Immig* (see Chapter 5.2.3). Pearson correlation coefficient can only take on values between -1 and +1. The value of the coefficient gives an indication of the strength of the relationship, with  $\pm 1$  as the perfect relationship between two variables, and 0 as no relationship at all between the two variables. The  $\pm$  sign indicates the direction of the relationship, whether there is a positive or negative relationship between the two variables (Pallant 2007). A positive correlation indicates that if one of the variables increases, so does the other. A negative correlation indicates an increase in one of the variables while the other one decreases.

Table 6.6 shows that both Australia and Canada have significant correlation between *Science score* and the variable for teacher employment and salaries, *Autemploy*. Australia has the highest correlation coefficient with the value 0.30, while the coefficient is only 0.16 for Canada. There are 846 valid cases for Canada, which indicates a certain ambiguity about the result since significance is achieved with lower correlation coefficient when the sample is large (see Chapter 5.2.5). The correlation coefficient for Norway takes on almost the same value (0.14) as for Canada, but this result is not significant for Norway with 175 cases. Canada is the only country with correlation between the variable for student learning, *Autlearn*, and the variable for student achievement, *Science score*, but the correlation coefficient value is low, 0.19, and the same uncertainty with significance achieved in large samples applies. All the other countries have lower correlation values than Canada when

testing for a relationship between the construct reflecting student learning and students' achievement. Economic-, Social- and Cultural Status (*ESCS*) shows significant correlation with *Science score* in all countries at 0.01 level. The value of the correlation coefficient between *ESCS* and *Science score* is much higher than for the other variables expressing a significant relationship. For Australia the coefficient is as high as 0.75, followed by Canada with the value 0.57, and the three Nordic countries with somewhat lower values. Sweden and Norway correlate negatively with Immigrant Background, respectively at 0.01 level and 0.05 level. Finland has the same correlation coefficient as Norway, but is not significant due to a lower number of valid cases. The correlation coefficient for the Nordic countries is negative, which indicates that a high proportion of immigrant students correlate with low performance. Australia also shows a significant correlation between *Science score* and *Immig*, but this is a positive correlation, which reflects that immigrant students achieve a high science score.

Table 6.6 Analysis of Correlation between *Science Score* and School Autonomy and between *Science Score* and Family Background

|                  |                     | Australia | Canada | Finland | Norway | Sweden  |
|------------------|---------------------|-----------|--------|---------|--------|---------|
| <i>Autemploy</i> | Pearson Correlation | .296**    | .159** | -.097   | .139   | .099    |
|                  | Sig.                | .000      | .000   | .243    | .066   | .175    |
|                  | N                   | 346       | 846    | 146     | 175    | 189     |
| <i>Autlearn</i>  | Pearson Correlation | .028      | .189** | .139    | -.091  | .078    |
|                  | Sig.                | .597      | .000   | .087    | .210   | .292    |
|                  | N                   | 355       | 852    | 152     | 190    | 186     |
| <i>ESCS</i>      | Pearson Correlation | .747**    | .568** | .423**  | .473** | .438**  |
|                  | Sig.                | .000      | .000   | .000    | .000   | .000    |
|                  | N                   | 356       | 896    | 155     | 203    | 197     |
| <i>Immig</i>     | Pearson Correlation | .151**    | .058   | -.144   | -.145* | -.216** |
|                  | Sig.                | .004      | .082   | .073    | .040   | .002    |
|                  | N                   | 356       | 896    | 155     | 203    | 197     |

\*\*Correlation is significant at the 0.01 level

\* Correlation is significant at the 0.05 level

*Science score*: Measure for Student Achievement

*Autemploy*: Hiring and Firing of Teachers, Establishing Teacher Salaries and Determining Salary Increases.

*Autlearn*: Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered.

*ESCS*: Economic-, Social- and Cultural Status.

*Immig*: Immigrant Background

Sig: Statistical significance

N: Number of schools applicable for the variable

## 6.2.2 Multiple Regression Analysis

Multiple regression analyses are applied in order to investigate several features of the alleged relationship between the independent variables; *Autemploy*, *Autlearn*, *ESCS* and *Immig*, and the dependent variable; *Science score*. In the first multiple regression analysis performed, the independent variables are applied simultaneously. This reveals how much each independent variable contributes to the variance in the dependent variable when the other variables are held constant (Table 6.7). Secondly, a multiple regression analysis where the variables are entered one-by-one in a particular order gives the opportunity to test the contribution of the autonomy variables, *Autemploy* and *Autlearn*, when socio-economic status and immigrant background are controlled for (Table 6.8). The final analysis demonstrates how well each of the independent variables can predict the dependent variable (Table 6.9). This is done by calculating  $R^2$ , the coefficient of determination (see Chapter 5.2.3).

Table 6.7 Multiple Regression Analysis, Simultaneous Method.  
Standardized Coefficient Beta and Prediction of Variance in *Science Score*.

|           | N   | <i>Autemploy</i> | Sig  | <i>Autlearn</i> | Sig  | <i>ESCS</i> | Sig  | <i>Immig</i> | Sig  | $R^2$ |
|-----------|-----|------------------|------|-----------------|------|-------------|------|--------------|------|-------|
| Australia | 345 | -.035            | .400 | -.044           | .248 | .769**      | .000 | -.005        | .889 | .562  |
| Canada    | 835 | -.030            | .346 | .092**          | .003 | .574**      | .000 | -.078**      | .008 | .334  |
| Finland   | 142 | -.170*           | .028 | .051            | .505 | .467**      | .000 | -.176*       | .021 | .246  |
| Norway    | 171 | .042             | .557 | -.093           | .171 | .457**      | .000 | -.134*       | .050 | .250  |
| Sweden    | 179 | .067             | .338 | .055            | .414 | .405**      | .000 | -.181**      | .010 | .227  |

\*\* Significant at the 0.01 level

\* Significant at the 0.05 level

Independent variables:

*Autemploy*; Hiring and Firing of Teachers, Establishing Teacher Salaries and Determining Salary Increases. *Autlearn*; Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered.

*ESCS*; Economic-, Social- and Cultural Status. *Immig*; Immigrant Background

Dependent variable: *Science score*; Measure for Student Achievement.

Standardized coefficient: Expresses the contribution of each independent variable to the variance in the dependent variable.

N: Number of Schools Participating

Sig: Statistical significance

$R^2$ : Variance in the dependent variable predicted by all the independent variables

$R^2$  in Table 6.7 tells how much of the variance in the dependent variable, *Science score*, is predicted by all the independent variables, *Autemploy*, *Autlearn*, *ESCS*, and *Immig*

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combined. As described in Chapter 5.2.3,  $R^2$  can be expressed as percentage (multiply the value by 100). In this analysis, Australia has the highest  $R^2$  value; the independent variables predict as much as 56.2% of the variance in *Science score*. Canada follows with 33.4%, while in the Nordic countries the estimation is only about 25%.

The values for the standardized regression coefficients are between 0 and  $\pm 1$ , the closer to  $\pm 1$  the more significant contribution. When comparing the regression coefficients obtained, it is important to use the standardized coefficient beta. The beta values for each of the variables have been converted to the same scale to make them equivalent and comparable. Just like Pearson's correlation coefficient, the regression coefficients can only ascertain relationship between variables, but never explain underlying causal mechanisms (see Chapter 5.2.4). To find out which of the independent variables included in the set that contributes to a change in the dependent variable, all the variables are entered simultaneously in a multiple regression analysis, and the beta values are examined. For all countries *ESCS* has the largest beta value, which means that socio-economic status makes the strongest unique contribution in explaining the dependent variable. The significant column indicates whether the unique variable's contribution to the variance in science score is significant or not, and *ESCS* makes a significant contribution in all the countries. The second largest contributor is *Immig*, which makes a significant contribution in all countries except Australia. Canada has a very low beta value for *Immig* (-0.078), but is still significant at the 0.01 level, which indicates that Canada's large number of cases may influence the result.

The contribution of the school autonomy variables, *Autemploy* and *Autlearn*, are minor. Finland is the only country where *Autemploy* turns out to be significant, though with a low coefficient. The beta value is negative, indicating that a high level of school autonomy regarding teacher employment and salary provides a negative contribution to student achievement. In the correlation analysis (Table 6.6), *Autemploy* correlates with *Science score* for both Australia and Canada, but the multiple regression analysis reveals that this autonomy variable's contribution to student achievement can be covered by one or several of the other independent variable(s). In Canada, the construct reflecting student learning, *Autlearn*, makes a significant contribution to the students' science achievement. However, the value is only 0.092, and when looking at the values for the other countries, I find that

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Norway has approximately the same value, only with different prefix (-0.093), without being a significant contributor to the prediction of *Science score* in this country. This brings about some ambiguity about the results, because significance is easier achieved in larger samples, and Canada has 835 valid cases compared to Norway with 171.

It is already expected, based on the correlation and multiple regression analyses (Tables 6.6 and 6.7) that the relationship between the school autonomy variables and science achievement is small, almost negligible for some of the countries. To assess the significant results achieved for the two school autonomy variables, they are separately applied in stepwise multiple regression analyses together with the variables expressing the students' family background (*ESCS* and *Immig*)(Table 6.8). Stepwise method refers to the variables being entered one by one in a particular order. This makes it possible to find the contribution of each of the school autonomy variables when controlling for socio-economic status and immigrant background. The first step of the analysis represents a correlation between *Autemploy/Autlearn* and *Science score*, then the students' immigrant background is added as a third variable to control whether this variable makes any difference to the contribution of variance in student achievement. This is called partial correlation, when calculating a correlation between two variables while controlling for the effect of a third variable. To control for each of the variables expressing family background separately, *Immig* is replaced with *ESCS*, and the relationship between the school autonomy variables and science achievement is calculated while controlling for the effect of socio-economic status. The two family background variables can also be controlled for jointly by entering them in the same sequence; *Autemploy/Autlearn + Immig + ESCS*, but the unique effect from each of them is revealed when they are controlled for separately. Socio-economic status has much stronger effect on student achievement than immigrant background (Table 6.7), and by entering them separately, a possible effect from *Immig* would not disappear in the larger effect from *ESCS* (Table 6.8).

Table 6.8 illustrates that the contribution of the school autonomy variables to student performance almost vanish when controlling for socio-economic status. The only significant contributions left, is a weak negative contribution from the autonomy variable expressing teacher employment and salaries, *Autemploy*, in Finland. In addition, the autonomy variable regarding student learning, *Autlearn*, contributes to student achievement in Canada. The

coefficient for Canada has a very low value, 0.075, and as repeatedly stated; with a large sample size, very weak relations can be found to be statistically significant. For Finland, however, the variable *Autemploy* indicates a negative contribution to the students' science score, also seen in the previous multiple regression analysis (Table 6.7). This reveals that when controlling for socio-economic status in Finland, the students at schools with high level of autonomy regarding teacher employment and salaries tend to achieve lower science scores than students in less autonomous schools. The multiple regression analysis (Table 6.7) has already made it clear that the significant correlation found between *Autemploy* and *Science score* for Australia and Canada can be explained by the other variables. Table 6.8 shows that the contribution from socio-economic status, *ESCS*, is the main source for explaining the significant results achieved. The contribution of *Autemploy* to student achievement disappears when controlling for the contribution of *ESCS*.

Table 6.8 Stepwise Multiple Regression and Partial Correlation

|                  |           | Pearson<br>Correlation | Partial<br>Correlation.<br>Controlling<br>for <i>Immig</i> | Partial<br>Correlation.<br>Controlling<br>for <i>ESCS</i> | Partial<br>Correlation.<br>Controlling for<br><i>Immig+ESCS</i> |
|------------------|-----------|------------------------|--|---|---|
| <i>Autemploy</i> | Australia | .296**                 | .287**   | -.049   | -.050   |
|                  | Canada    | .159**                 | .155**   | .002  | .004  |
|                  | Finland   | -.097                  | -.074  | -.194**   | -.167*  |
|                  | Norway    | .139                   | .161*  | .013  | .033  |
|                  | Sweden    | .099                   | .155*  | .030  | .076  |
| <i>Autlearn</i>  | Australia | .028                   | .023   | -.053   | -.053   |
|                  | Canada    | .189**                 | .185**   | .075**  | .081**  |
|                  | Finland   | .139                   | .151   | .032  | .041  |
|                  | Norway    | -.091                  | -.093  | -.088   | -.089   |
|                  | Sweden    | .078                   | .069   | .071  | .064  |

\*\* Significant at the 0.01 level

\* Significant at the 0.05 level

School autonomy variables: *Autemploy*; Hiring and Firing of Teachers, Establishing Teacher Salaries and Determining Salary Increases. *Autlearn*; Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered.

Controlling variables: *ESCS*; Economic-, Social- and Cultural Status. *Immig*; Immigrant Background

Dependent variable: *Science score*; Measure for Student Achievement

Immigrant background does not influence the contribution of the school autonomy variables to the same extent as socio-economic status. For the Nordic countries, where *Immig* expresses a negative relationship with student performance, the correlation coefficient



increases for the autonomy variable representing teacher employment and salaries, *Autemploy*, when the contribution of *Immig* is controlled for. In Sweden and Norway, the proportion of low performing immigrant students is considerable, and when the negative contribution of *Immig* is controlled for, the contribution of *Autemploy* to students' science achievement becomes significant. However, when controlling for the socio-economic status, this effect disappears.

In Table 6.7,  $R^2$  tells how much of the variance in the dependent variable, *Science score*, is predicted by all the independent variables collectively. Table 6.9 and Figure 6.5 below show how much  $R^2$  increases when adding the independent variables one by one, ending up in the last column, *+ESCS*, with the combined contribution of all the independent variables. It is quite evident that socio-economic status is the best predictor of the variables employed for how well students perform in science. Australia is the country where socio-economic status makes the biggest contribution; as much as 45% of the students' achievement can be predicted by *ESCS*. In Canada 29% of student achievement can be predicted by *ESCS*, in Finland and Norway about 20%, and Sweden lowest with 16%. The two autonomy variables do not contribute much, neither does immigrant background; among the five countries, *Immig* predicts student performance best in Sweden, by approximately 6%.

Table 6.9 Predicted Contribution to Variance in *Science Score*

|           | Predicted contribution, $R^2$ |                  |               |              |
|-----------|-------------------------------|------------------|---------------|--------------|
|           | <i>Autemploy</i>              | <i>+Autlearn</i> | <i>+Immig</i> | <i>+ESCS</i> |
| Australia | 8.8 %                         | 9.2 %            | 10.9 %        | 56.2 %       |
| Canada    | 2.5 %                         | 4.4 %            | 4.5 %         | 33.4 %       |
| Finland   | 0.9 %                         | 3.2 %            | 5.1 %         | 24.6 %       |
| Norway    | 1.9 %                         | 3.0 %            | 5.7 %         | 25.0 %       |
| Sweden    | 1.0 %                         | 1.4 %            | 7.2 %         | 22.7 %       |

$R^2$ : Predicted contribution to variance in *Science score*

Independent variables (added one by one and summarized):

*Autemploy*: Hiring and Firing of Teachers, Establishing Teacher Salaries and Determining Salary Increases.

*Autlearn*: Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered.

*Immig*: Immigrant Background *ESCS*: Economic-, Social- and Cultural Status.

Dependent variable: *Science score*; Measure for Student Achievement

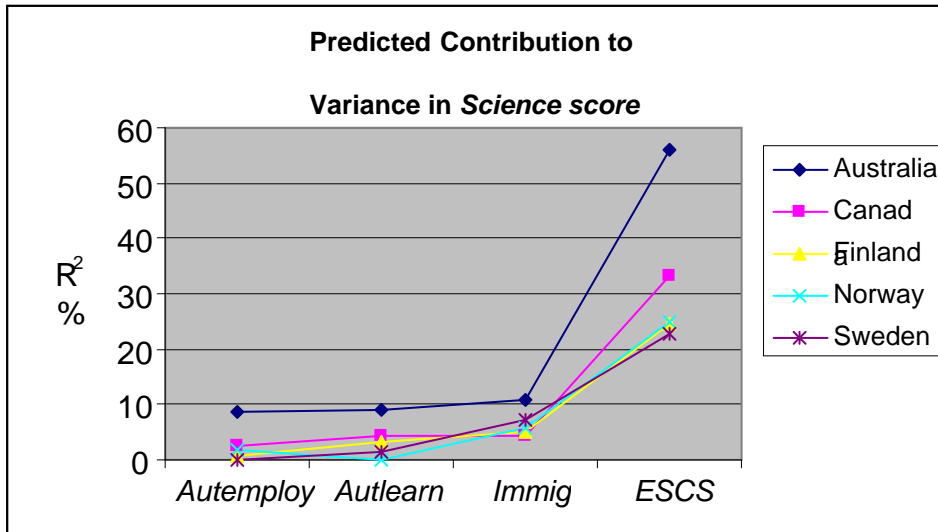


Figure 6.5 - Predicted Contribution to Variance in *Science Score*

R<sup>2</sup>: Predicted contribution to variance in *Science score*

Independent variables (added one by one and summarized):

*Autemploy*; Hiring and Firing of Teachers, Establishing Teacher Salaries and Determining Salary Increases.

*Autlearn*; Student Discipline, Student Assessment, Textbooks, Course Content and Course Offered.

*Immig*; Immigrant Background. *ESCS*; Economic-, Social- and Cultural Status.

Dependent variable: *Science score*; Measure for Student Achievement

## 7. Discussion

As seen in the previous chapter, the two variables expressing the level of school autonomy do not affect student achievement largely in the countries examined. In the correlation analysis, both Australia and Canada demonstrate a positive relationship between student achievement and level of school autonomy, but when controlling for factors known to have an influence on student learning, particularly socio-economic status, the effect almost disappears.

All the five countries show considerable variation within the country for the two school autonomy variables; *Autemploy* and *Autlearn*, and this is the main focus in the first section of this chapter. The second set of questions regarding school autonomy, answered by the principals in the PISA survey, is utilized as support in the interpretation of the results (see Chapter 6.1.6). Student performance, reflected in the variable *Science score*, alongside the variables regarding family background; socio-economic status and immigrant background, are also a part of the discussion. Comparisons are made between the countries, both considering mean values as well as distribution within the country for all the variables. Lastly, the results from the relationship analyses are debated, guided by the hypothesis stating that “*Educational decentralization improves student achievement*”.

### 7.1 Between-Countries and Within-Countries Comparison

In this section, the countries are compared both by the mean value of the variables examined and by the variation expressed in these variables. The variation reflects between-school differences within the country regarding level of school autonomy, student performance and family background.

#### 7.1.1 School Autonomy Level

The school autonomy level is based upon what perception the principals have of themselves being autonomous regarding personnel and curricular decisions. In this study, the level of

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school autonomy is measured through two constructs; *Autemploy*, autonomy regarding teacher employment; hiring/firing teachers, establishing teacher salary and determine salary increase for teachers, and *Autlearn*, autonomy regarding student learning; course offered, course content, textbooks, student discipline and student assessment. It should be kept in mind that Sweden has low reliability for the construct *Autemploy*, while Finland and Norway express low reliability for *Autlearn*, which makes these constructs somewhat unpredictable for the concerning country. The autonomy variables have a range from 1 to 3, where 1 represents central level (national and/or regional authority) and 3 represents local/school level (school board and/or principal and teachers).

All the five countries have considerable higher school autonomy for *Autlearn* than for *Autemploy*, except Sweden with equally high level for both. Of the five countries examined, Sweden is the only one informing that recruitment of teachers is typically carried out locally within each school, alongside the responsibility for determining teachers' salaries. The autonomy level for Sweden is 2.6, while the other countries' level is 1.7 and below (Table 6.4, Chapter 6.1.5). This suggests that decisions regarding teacher employment and salaries are typically carried out at municipality and national level for Finland and Norway, and at provincial/state/territory level for Australia and Canada. Since the autonomy level 1.7 is close to a mixed model where both local and central authorities have responsibilities, a closer look at the countries' education system reveal that the school boards in Canada are largely responsible for staffing while the provincial government provides the salaries. In Finland and Norway, the salary is set centrally while hiring of teachers is a matter of choice between the municipality and the schools. This is supported by the second set of questions answered by the school principal, Q12, regarding the *influence* of certain bodies concerning staffing, budgeting, curricular content and assessment practices (Tables 6.5a-d, Chapter 6.1.6). 73% of Swedish principals respond that teacher groups have a direct influence on staffing, while the other countries express influence from both central/regional level as well as teacher groups and school boards (Table 6.5.b).

The decentralized educational system in all five countries has similar procedures regarding allocation of decision-making power to school level. In the Nordic countries, the municipalities has the power to delegate authority and thus determine the scope of school autonomy, while in Australia and Canada this is decided at state level (and to some extent

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school boards in Canada). This increases the heterogeneity between schools and explains the big differences within each country regarding the autonomy variables. For *Autemploy*, Australia has the largest spread of results followed by Norway and Canada. It can be expected to find different policies for teacher employment and salaries within federate countries like Australia and Canada where each state has its own educational ministry, but it is more surprising that a small country like Norway, with a former history of strong central policy, shows the same extent of dispersion between their schools. For the autonomy variable expressing student learning, *Autlearn*, the difference between schools is much lower than for *Autemploy* within all five countries. Canada and Norway have somewhat larger between- school variance than the others.

For *Autlearn*, the variable expressing level of school autonomy on issues related to student learning, the autonomy level is between 2.11 and 2.66 for the five countries (Table 6.4, Chapter 6.1.5). Sweden enjoys the largest school autonomy for this variable too, but Finland, which demonstrates the lowest level of school autonomy for teacher employment and salaries, has an equally high level of school autonomy as Sweden regarding student learning. Looking at Figure 6.2 (Chapter 6.1.4), Finland and Australia reveal the biggest difference between the two school autonomy variables, while Canada and Norway do not enjoy the same increase in autonomy level for student learning relative to their autonomy level for teacher employment and salaries. It is worth mentioning that Norway implemented a new curriculum in 2007 which grants schools more autonomy, especially regarding student learning (see Chapter 4.4). Based on the figure, it seems like personnel management domain remains largely beyond the control of schools in all countries except Sweden, and where decisions making authority is decentralised to schools, principal and teachers play a major role only in the domain of curriculum and instruction.

When looking at the responses from Q12 regarding instructional content (Table 6.5c) and assessment practice (Table 6.5d), the principals' perception is that both central authority and teacher groups exert a substantial influence in all countries (see Chapter 6.1.6). Sweden is the exception, with lower influence from central authority, especially regarding instructional content, which supports the findings in Q11. Teacher and student groups are most influential in Sweden, and this might be a result of a policy that requires principal and teachers at every school in Sweden to establish a work plan defining issues such as course content,

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organization, and teaching methods. Teacher groups have considerable influence on instructional content in all countries, in Finland even more than in Sweden, the difference being that central authority is just as influential as teachers in Finland. Finland expresses high level of school autonomy regarding student learning, so it is expected that teachers are influential on this matter, but the principals in Finland obviously feel that the national curriculum is more influential on instructional content than the Swedish do. Norway and Canada have slightly lower influence from teacher groups than the other countries, just as expected based on their autonomy level regarding student learning.

Australia is far more influenced by external examination board than the other countries, for both instructional content and assessment practice. In Australia, there are standardized tests for grade 3, 5, 7 and 9 within five domains; English, mathematics, science, civics and citizenship and ICT. The procedures surrounding these tests are supervised by the Ministerial Council of Education, and the council has also provided a framework for national reporting on student achievement and for public accountability by school authorities. External examination boards are influential in the assessment practice with all the standardized tests being introduced, and a possible explanation for why the Australian principals experience this body as highly influential on the instructional content as well, might be that what is taught at school is adjusted towards the standardized tests. This seems contradictory, since the construct *Autlearn* expresses that Australia enjoys a high level of school autonomy regarding issues related to student learning, including student assessment. One explanation can be that the school autonomy level is calculated based on *responsibility*, and the question here is whether external examination board is *influencing* the decision-making, which might give different answers. In Norway, the principals report that teacher groups have considerably more influence regarding assessment practice than they have regarding instructional content, and student groups also exert a certain influence on assessment practice compared to the other countries. Norway together with Sweden are least influenced by central authority on the subject of assessment, which can be expected for Sweden with all over large school autonomy, but this is not supporting previous findings for Norway.

Budget is not included in any construct for school autonomy, and the inconsistency between the two set of questions answered by the principal, Q11 and Q12, in the matter of budgeting

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supports this decision. When looking at the autonomy level for Formulating schoolbudget and Budget allocating, which is based on the responses from Q11, all countries express high level of school autonomy regarding allocation of the budget, while formulation of schoolbudget has a much lower autonomy level, especially for Canada and Finland (Figure 6.1, Chapter 6.1.2). In Q12, where the principals have reported which bodies exert an *influence* on the budget, the picture is a bit different (Table 6.5b, Chapter 6.1.6). Here, Australia, which expresses the largest level of school autonomy regarding allocating and formulating budget in Q11, reports that central level authority has a high influence, about 60%, on budgeting. There are more examples of inconsistency between Q11 and Q12 regarding budgeting, and for both sets of questions, several of the respondents have ticked for more than one authority level, which makes it difficult to get a clear picture of the decision-making level. There are also differences in the wording in the two sets of questions, which may lead to different answers; Q11 asks who is *responsible* for formulation and allocation of the budget, while Q12 asks who exert an *influence* on the budget. I also believe there is room for misunderstanding regarding the meaning of Formulating budget and Budget allocation in Q11. Does formulation, for example, simply mean a suggestion on how to allocate the budget, or is it meant to be strictly followed? This can lead to many different interpretations from the principals responding to the questions.

### 7.1.2 Student Achievement

The students' science score in PISA 2006 is utilized as measure for student achievement in my study. PISA's achievement scores represent a yield of learning at age 15, rather than a direct measure of attained curriculum knowledge at a particular grade level. According to OECD (2006), specific knowledge acquisition is important in school learning, but the application of that knowledge in adult life depends crucially on the attainment of broader concepts and skills, which is particularly significant in light of the concern among nations to develop human capital. This also applies to Castells' (1996) description on today's information age, where versatile skills are needed to survive in the labour market.

In this study, variation in science achievement reflects differences between schools within the country, and not between students (Table 6.4, Chapter 6.1.5). For the over all

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performance in science, Finland is the best performing country of all participants in the PISA 2006 survey, neighbouring Sweden and Norway do not perform that well, whereas Australia and Canada are among the top achievers. While the mean score is useful in assessing the overall performance of countries, it hides important information on the distribution of performance within countries. If two countries express the same mean score, one country may have performance clustered around the average with smaller proportions of the students at extremes, while the other may have a larger proportion of students at the lower and upper extremes of the scale. Countries may also have similar percentage of students in the highest level of proficiency, but differ in average score due to different percentage of students in the lower levels. In order to make the necessary policy interventions, policy makers need to be aware of how the overall performance is distributed between students. Regional differences within the country may also be masked by the mean score. The scores in one part of the country can differ from the scores in another part. This is apparent in Canada where the score in some provinces/territories is above or at the same level as top performing Finland, while in others the score is below OECD-average (CMEC 2009).

Table 6.4 (Chapter 6.1.5) shows the distribution of student performance between the schools in each country. Finland, with the highest mean score also has the lowest difference in achievement between their schools. According to the Finnish National Board of Education (2009b), the most notable reason for Finland's success in the PISA survey is educational equality. The overall objective of Finnish school system, and of the other Nordic countries, is to provide equal opportunities for all, irrespective of sex, geographic location or economic-, social- or cultural background. This is confirmed through small between-school variance in the Nordic countries compared to the other OECD countries, indicating that performance is not closely related to the schools in which students are enrolled (PISA 2007b). Finnish students are performing very well, and small differences between schools signalise high and consistent performance standards across schools in the entire country. In Norway, however, with science score below OECD-average and small between-school differences, the performance standards are equally low throughout the country. So what Finland refers to as a key aspect of their success, is not that successful in Norway. The largest between-school differences in my study is within Australia and Canada, this might be anticipated due to differences in school policies between states and provinces, but even here



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differences between schools are small compared to differences between students. This implies that the character and life circumstances of each student are more important for school performance than to which school the student is enrolled. The variation in student performance within each country participating in PISA 2006 is also many times larger than the variation between countries (OECD 2007b).

Figure 6.3 and 6.4 (Chapter 6.1.5) combine the countries' science score and school autonomy level. If the hypothesis "*Educational Decentralization Improves Student Achievement*" is true, a certain pattern is expected with correspondence between high level of school autonomy and well performing students. The figures do not support the hypothesis; Finland with the highest science score has the lowest school autonomy level for teacher employment and salaries, and Sweden with high level of school autonomy do not have top achieving students. Regarding student learning, Finland has high level of both school autonomy and science score, but Sweden and Australia with approximately the same autonomy level as Finland, both have considerable lower science score.

### 7.1.3 Family Background

A major focus and challenge for education policy is to achieve high quality education while limiting the influence of family background on learning outcomes. The alleged goal is to make the same opportunities available to every student in an equitable school system (OECD 2007a). Socio-economic status is regarded as one of the strongest predictors for achievement in schools, and the student questionnaire in the PISA survey provides information about the students' home social background. The immigrant background of the student is an additional measure for family background, also made available through the PISA context questionnaire.

Of the five countries in this study, Norway has the highest average score for economic-, social- and cultural status (*ESCS*), thus the most advantageous family background (Table 6.4, Chapter 6.1.5). Australia has the lowest score, and the three remaining countries' scores are clustered in the middle. Finland and Norway are the most homogenous countries expressing low dispersion between their schools, while Sweden has equally large spread in

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socio-economic status as Australia and Canada. Sweden, like the other Nordic countries, is a socialistic welfare-state characterized by the ambition of reduced social differentiation, low income differentials and a high level of social security. Thus, the extent of between-school difference is more surprising for Sweden than for the two federate countries. As for *Science score*, the between-school difference for socio-economic status in all five countries is much lower than the between-student difference is within the countries (Kjærnsli et al. 2007).

Immigrant background is the other variable reflecting the students' family background. Australia has the largest number of students with immigrant background, Finland the lowest (Table 6.4, Chapter 6.1.5). The three Nordic countries differ greatly in percentage of foreign born students, Sweden has the same percentage as Canada, twice as many as Norway, and almost tenfold of Finland. For immigrant background, as for socio-economic status, Sweden is more comparable to Canada and Australia than the other Nordic countries, with high number of immigrant students and large between-school difference in number of immigrant students. The immigration policies differ between the five countries; compared to the Nordic countries, immigrant populations in Canada and Australia tend to have more advantaged backgrounds due to immigration policies favouring the better qualified in these countries (OECD 2007b).

## 7.2 Student Achievement and Level of School Autonomy

The relationship analyses between student achievement, *Science score*, and level of school autonomy regarding teacher employment and salary, *Autemploy*, reveal that there is no significant positive relationship between the two when the student family background is controlled for (Table 6.8, Chapter 6.2.2). Australia and Canada both have significant correlation between *Science score* and *Autemploy* before controlling for family background (Table 6.6, Chapter 6.2.1), while Finland is the only country with a significant correlation after controlling for family background. However, the relationship is negative, indicating that a high level of school autonomy regarding teacher employment and salary decisions provides a negative contribution to student achievement. This is consistent with OECD's findings from PISA 2000, where a significant negative relationship was found between reading literacy and school autonomy in the domain of personnel management for the OECD

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countries (OECD 2005a). After controlling for family background, a weak relationship between the autonomy variable representing items related to student learning and student achievement is found for Canada. Neither of the other countries demonstrates any relationship between these two, not even before controlling for family background.

My research questions, “*Does the transition of educational authority from central to local level affects student achievement?*” and “*Does a potential relationship between local autonomy and student achievement still exist after controlling for socio-economic status and immigrant background?*”, can now be answered. I found that the level of school autonomy regarding teacher employment and salaries affects student achievement for Australia and Canada, but this relationship does not exist after controlling for family background. For Finland, a weak relationship exists after controlling for socio-economic status and immigrant background, but this affects student achievement negatively. Canada expresses a relationship between school autonomy regarding student learning and student achievement which still exists after controlling for family background. However, this is a very weak relationship, and both Norway and Sweden have partial correlation coefficient with approximately the same value as Canada, but Canada has a much larger sample than the Nordic countries, thus only a weak relationship is needed to achieve statistical significance.

My hypothesis; “*Educational Decentralization Improves Student Achievement*”, implies a causal relationship. My assumption is based upon arguments heavily emphasizing decentralization as a quality booster (Chapter 2.3), but the analyses performed can only provide statistical relationships and not explain cause-effect relationships. The lack of association, however, probably offers more information regarding the hypothesis than the presence of a correlation would have. Correlation can only support the notion of causation, but never prove it. Another consideration to make when interpreting the results, is the low reliability for some of the constructs (*Autemploy* for Sweden, *Autlearn* for Finland and Norway). This makes the results somewhat unpredictable for the countries concerned. The major shortcoming of this research, however, is that the school autonomy level is based upon the perception of one person; the principal at the sampled schools. This brings about some ambiguity regarding the results, since personal bias may influence how the questions are answered. When looking through the responses from the set of questions upon which the autonomy level is based (Q11), I found that some principals have ticked for all the boxes

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available for several items, indicating that central level authority, regional level authority, school board and principal/teachers were equally responsible for the task in question. This makes it hard to get a clear picture of the decision-making level. In addition, the fact that this is the opinion and interpretation of only one person leads to uncertainty with reference to the credibility of the answers. Anyhow, this is the only available measure for school autonomy in the PISA 2006 survey, and the results achieved have to be interpreted with this limitation in mind.

### 7.3 Student Achievement and Family Background

The strongest relationship expressed is between Economic-, Social- and Cultural Status (*ESCS*) and student achievement (Table 6.6, Chapter 6.2.1). For Australia the correlation coefficient is as high as 0.75, followed by Canada with the value 0.57, and the three Nordic countries with somewhat lower values. The Nordic countries are often recognized as countries with high level of equality, thus a weak relationship between socio-economic status and student achievement is expected. However, the results show a pretty strong correlation for the Nordic countries, and when calculating the predicted contribution from *ESCS* to student achievement, the Nordic countries come out with approximately 20%, compared to Australia's 29% and Canada's 45% (Table 6.9, Chapter 6.2.2). This is low numbers compared to other OECD countries, but the students' socio-economic status is obviously related to school performance, even in the Nordic countries. Socio-economic status cannot be changed by education systems, but the influence of this factor is worth knowing to inform policymakers and educators how to target particular interventions.

Student achievement in Sweden and Norway correlates negatively with immigrant background, for Finland too, but for Finland the correlation is not statistical significant due to lower number of valid cases. A negative correlation coefficient indicates that a high proportion of immigrant students correlate with low performance. Australia demonstrates a positive correlation between *Science score* and *Immig*, and the difference in achievement between immigrants in the Nordic countries and Australia might be due to immigrant policies where Australia favours better qualified immigrants. The number of immigrant students in Norwegian and especially in Finnish schools is low, but the negative result is

worth noticing for all the Nordic countries since this indicates that a specific student group is performing at a lower level than students at large, and policy makers need to know this to make necessary interventions. My findings suggest that socio-economic status is more influential than immigrant background, but since the number of immigrant students is low, it is expected that this group of students contributes less to the prediction of student performance than socio-economic status does.

## 7.4 Reframing the Decentralization Debate

Educational systems worldwide are influenced by international organizations, like OECD, when they offer advice and suggest how educational delivery can be changed in today's globalized world. To attain high quality education with overall better performing students, OECD recommends decentralization policies carried out through educational reforms. Decentralization is believed to yield considerable efficiency in the management of educational systems because the local level is familiar with local condition, thus, a better and more flexible allocation of scarce resources can take place (see Chapter 2.3.3). All the five countries in this study have implemented educational reforms over the past years, all influenced by globalization and the need to improve and educate their workforce to become a participant on the world market. Knowledge is the new economy, and to attain knowledgeable and skilled citizens, a high quality education is essential. For most countries, decentralization is the strategy of choice for improvement, as recommended by OECD, with transfer of decision-making power from central to local level authorities, in some cases all the way to the school building and the principal. Considering that my findings do not support a relationship between student achievement and level of school autonomy, I will now discuss some of the arguments proponents of decentralization present (see Chapter 2.3) and compare these arguments to findings and statements from other researchers and theorists.

### 7.4.1 Is Decentralization a Quality Booster?

Decentralization is introduced as a means to enhance quality of education (see Chapter 2.3.6), but in my analyses, a positive relationship between local autonomy and student

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achievement is not supported by empirical data. When family background is controlled for, the contribution from the school autonomy variables on student achievement is practically negligible. Structural change cannot succeed without cultural change, argues Murphy and Beck (1995), and Fiske (2000) believes there are limits to what administrative decentralization can accomplish, because there is no reason to presume that a change in educational system by itself will lead to either efficiency or to better teaching and learning. The causal chain from altered locus of decision-making to student achievement is complex and long, and research suggests that the level of school autonomy only has a modest effect on student achievement (Murphy and Beck 1995, Fiske 2000, Cook 2007). Leithwood and Menzies (1998) state that improvement in student learning basically depends on implementation of more effective teacher practices, and such implementation is primarily a problem of teacher learning, not a problem of organization or structure. In an OECD report based on results from the PISA 2000 survey, the findings suggest that a high level of school autonomy puts an extra burden on the school boards and especially the principal, which in turn might result in a stronger focus of the school principal on administrative rather than on educational issues (OECD 2005a). Some studies, however, suggest that positive effect on school effectiveness and student learning might be mediated by school decentralization if this leads to improved school climate, enhanced accountability and increased flexibility (Hannaway 1993, Murphy and Beck 1995).

The most common argument in favour of decentralization and autonomy of schools is the belief that they will enhance the quality, effectiveness and responsiveness of schooling, but Carnoy (1999) believes the reduction of government public spending is just as important as to increase school productivity (see Chapter 2.3.2). With decentralization the local municipalities also have to bear more of the costs of education. Administrative responsibilities may be transferred to local levels without adequate financial resources and make equitable distribution or provision of services more difficult. Lundgren (1990) argues that decentralization is a reform strategy related to political responsibility and the economical situation, and not primarily focusing on the educational outcome and quality of education. According to Watson and co-workers (1997), improvement of quality in the educational system is not measured in terms of local autonomy, but in improvement of academic standards and criteria for quality assessment of both individuals and institutions.

There seems to be hard to find unambiguous support for decentralization as an answer to improved educational outcome. A number of decentralization measures concern efficiency goals (see Chapter 2.3.3), but there are found very little empirical evidence about whether decentralization policies in fact serve the goals their advocates use as rationales for these policies. McGinn (1997) and Winkler (1993) both argue that closeness to problems does not necessarily mean capacity to solve them. The major determinant is not where the mechanisms of governance are located, but rather the strength and power of participants in the process of governance. Weak administrative or technical capacity at local levels may result in services being delivered less efficiently and effectively in some areas of the country, thus a promising reform might be unsuccessful because of improper implementation.

At the same time as decentralization policies are introduced, there are tendencies in the opposite direction. Australia and Canada, federate countries with autonomous states and provinces, now have central framework for curriculum development, and the central government, especially in Australia, has increased its influence of the educational sector over the past decades. In Canada, a national program called the Pan-Canadian Education Indicators Program (PCEIP) is implemented to assess the education systems across provinces. There was a call for a more transparent system, and now the provinces educational system is accountable to all the different partners of education in Canada (CESC 2006). However, accountability is also a part of decentralization, and Winkler (1993) states that with distribution of authority follows the heavy burden of accountability (see Chapter 2.3.4). The central authority strengthens its influence in some areas by increasing the control of output. The power decentralization gives away with one hand, evaluation and accountability takes back with the other. According to the Secretary General of OECD, Angel Gurría (2007b), improved accountability is a fundamental counterpart to greater school autonomy. He declares that external monitoring of standards, rather than relying mostly on schools and teachers to uphold them, can make a real difference to results.

Measuring the benefits of educational decentralization and school autonomy is complicated. Decentralization of decision-making authority does not take place in isolation, there might be other policies supporting or impeding the decentralization process. Even if such other policies are absent, it is difficult to assess to what degree outcome, like the scores in the

PISA study, can be ascribed to decentralization alone since all educational strategies aim for improved quality in schooling (Maslowski et al. 2007, Woessman 2001). Winkler (1993) says that decentralization effects may be specific to a country, what works in one country does not necessarily work in another. The result of a changed system will depend on the system already in place and it is always important to consider the context in which decentralization takes place. The present governance strategy in every country has to be seen in a historical and comparative way, no models can be recommended with universal applicability, and even in specific places demands are likely to change over time. In addition, educational change is a slow process that requires adequate time and resources to conquer unforeseen obstacles, but decision-makers often wish to see rapid results. Critics have argued that reforms are implemented too hastily, often based on educational trends, swinging back and forth between different ideologies, rather than evidence (Winkler 1993, Karlsen 2000, Bray 2003).

#### 7.4.2 Factors Influencing Educational Outcome

In my study, socio-economic status is the most influential factor regarding student achievement (see Chapter 6.2), but in the complexity of factors surrounding educational delivery, several forces affect the outcome of education. It is an illusion to think that examination measures the effect of education, says Trow (1996). Education is a course of action pretending to have a measurable outcome, but teachers can influence students in various forms, and the most important once might not be measurable, he continues. He also includes family background, when pointing to the student's character and life circumstances as factors affecting student performance. Tyack (1993) argues that textbook publishers and ideologies about teaching practice are highly influential and may produce more homogeneity across classroom in a country than central directives could ever hope to yield. Thus the system may behave as if it were highly centralized even with decentralized reforms in governance. The curriculum traditions in the country may also influence the outcome of learning, and Hannaway and Carnoy (1993a) believe that performance can be promoted if the central authority sets higher curriculum standards and thereby increases the schools' demand for higher achievement by students. In addition, local personnel and administrators need to have a clear picture of the instructional objectives and the skills to reach them in



order to improve the outcome (Hannaway and Carnoy 1993b). Educational reforms may have potential and good intentions, but if the implementation at school level is inadequate, the wanted outcome will not take place (see Chapter 2.3.3). All the five countries in this study aim for higher curriculum standards with an emphasis on numeracy and literacy. Student achievement is measured through national and international tests, making those responsible for educational delivery accountable to the central authority and the public at large. Finland is the only exception with no national tests; compulsory education is only controlled by the national core curriculum.

Some people say that strong educational performance is all to do with money, but simply spending more will not guarantee better outcomes, argues Gurría (2007a). He says that evidence in the OECD data base reveals only a rather weak relationship between total education expenditures and student performance. Woessman (2001) has examined data from the Third International Mathematics and Science Study in 1995, and his results show that at given spending levels, an increase in resources does not generally raise educational performance. Differences from country to country in per-pupil spending do not help in understanding differences in educational performance. In PISA 2006, Finland and Australia do well with moderate expenditure, while Norway as a top spender performs below the OECD-average (OECD 2007b).

The relatively good performance of some Asian countries in international tests is believed to explain in some large part their economic success. According to Robinson (1999), many politicians and their advisers hold these truths to be self evident. Thus, in countries where the international tests have shown poor results in literacy and numeracy, this is assumed to have direct implications for the performance of the country's economy compared with other countries. This is based on the human capital theory which promotes the acquired skills and competencies of people as the reason and explanation for most of modern economic progress. This theory is supported by the OECD and adopted by the participating countries in PISA. Robinson (1999) argues that the relative improvement in educational achievement for students in some Asian countries may just as well have followed economic growth and not precipitated it. He sees no evidence of a cause-effect mechanism in one specific direction; economic growth could very well be the factor influencing student achievement in stead of the other way around.

## 8. Summary and Concluding Remarks

### 8.1 Summary

This study examines decentralization policies in education and whether they affect student achievement. About 1800 schools in five countries are compared; Australia, Canada, Finland, Norway and Sweden, and data from the PISA 2006 survey are utilized throughout the study. The main focus of PISA 2006 was on science literacy, and the students' science score is employed as measure for student achievement. In this study, the students are not compared individually, but the schools holding sampled students are compared. Within a country each school represents one case, and the score for the school is the average score of the sampled students in this school. The locus of decision-making power is based upon what perception the principals have of themselves being autonomous regarding personnel and curricular decisions. Family background is known from previous research as an influential factor on student performance, therefore socio-economic status and immigrant background is controlled for by employing data achieved from the context questionnaire in the PISA survey.

In Chapter 1.2, I put forward two research questions; *“Does the transition of educational authority from central to local level affects student achievement?”* and *“Does a potential relationship between local autonomy and student achievement still exist after controlling for socio-economic status and immigrant background?”* The findings implicate that the level of school autonomy has very little influence on student performance. In the countries expressing a significant positive correlation between school autonomy and student performance, mainly Australia and Canada, the effect disappeared when controlling for socio-economic status. Immigrant background demonstrates a minor effect compared to socio-economic status, but the number of immigrant students is low, thus a lower effect is expected. Finland is the only country with a significant correlation between student achievement and school autonomy in the domain of teacher employment after controlling for socio-economic status. However, the relationship is weak, and the coefficient is negative, indicating that a high level of school autonomy regarding personnel decisions provides a

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negative contribution to student achievement. The results attained in my study are not consistent with the hypothesis suggesting that “*Educational Decentralization Improves Student Achievement*”.

The strongest relationship expressed in the study, for all countries, is between Economic-, Social- and Cultural Status and student achievement. Australia and Canada demonstrate the strongest correlation, but the results show a pretty strong correlation even for the Nordic countries, although a weak relationship might be expected due to the emphasis these countries put on equality. The influence of socio-economic background is low compared to other OECD countries, but obviously related to school performance in all the five countries. Immigrant background correlates negatively with student achievement for the Nordic countries, indicating that a high proportion of immigrant students are low performers. The number of immigrant students is low in Norway and especially in Finland, but the fact that this group of students performs at a lower level than students at large, is important to know to make appropriate interventions.

Globalization is influencing all the five countries, and they recognize knowledge as the key to participate in the world market. The countries follow OECD’s advice to build human capital through high quality education to achieve economical development. Education is identified as the foundation for the countries’ future prosperity. Historically, Australia and Canada are decentralized countries, while the Nordic ones are centralized. Now they all have decentralized education system with a variety of transfer models between central, regional and local level authorities within each country. This leads to heterogeneity between schools regarding level of autonomy for different aspects of educational organization and delivery. It seems like personnel management domain remains largely beyond the control of schools in all countries except Sweden, and where decisions making authority is decentralised to schools, principal and teachers play a major role only in the domain of curriculum and instruction. Finland is the best performing country on the science scale and also expresses the lowest between-school difference. The two federate states, Australia and Canada, have the biggest spread in science score between their schools, but even here the differences between schools are small compared to the differences between students. This implies that the character and life circumstances of each student are more important for school

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performance than to which school the student is enrolled, regardless of the school's level of autonomy.

## 8.2 Concluding Remarks

The literature and arguments regarding the appropriate locus of control within educational administration is contradictory and ambiguous. In this study, when the education system in Australia, Canada, Finland, Norway and Sweden is compared in relation to the PISA achievement results, there seems not to be one best system. It is hard to find a direct link between the countries' score on the science scale and a specific educational model. Based on the results achieved, it can be suggested that decentralization is not *the* remedy for better quality education with overall top performing students. The belief in improvement of educational results when more decisions are taken closer to the school level implies a theoretical framework linking educational outcomes, levels of competencies in educational administration and loci of decision-making, argues Bottani (2000). It is in fact difficult to verify if decentralization increases efficiency at all, and in most countries an appropriate balance between centralization and decentralization is essential to the effective and efficient functioning of the educational system. To reach a single recipe that will be appropriate for all countries is impossible.

My analyses are limited by the fact that the school's autonomy level is based upon the perception of only one person, the principal. To depend upon one person's interpretation, brings about some ambiguity with reference to the credibility of the answers. In addition some of the constructs express low reliability; *Autemploy* for Sweden and *Autlearn* for Finland and Norway, making the results somewhat unpredictable for the countries concerned. Anyhow, the results achieved in this study support previous research suggesting that the level of school autonomy has negligible effect on student achievement (Murphy and Beck 1995, Fiske 2000, OECD 2005a, Cook 2007). Policymakers need to bring this to mind before implementing educational reforms with even more emphasis on school autonomy. Movement of authority within the educational organization is not as influential on student achievement as many advocates of decentralization like to think.

In the discussion part, I refer to several researchers who points to the need for more than structural changes in an education system to achieve high quality education (see Chapter 7.4). What goes on in the classroom is essential for student learning, and teacher quality is suggested as one of the most important factors in student achievement. Lykins and Heyneman (2008) believe it is possible to narrow the achievement gap between poor and rich students and between minority and white students if teacher quality is more equitably distributed. I have not examined the different countries' teacher education and the requirement for teaching different subjects, but it is well known that Finland has emphasized their teacher education and the high status the teacher profession enjoys as an explanation to why their students are best performers in the PISA survey (FNBE 2009b).

Another feature of the school system worth looking at is whether school leadership affects student achievement. The quality of the school leadership is also suggested as a crucial factor to achieve high quality education, especially when the decision-making power is located within the school building. There are performed a number of school leader surveys, and how the principal is performing the task of leadership, and what is perceived as good leadership, varies between countries (Møller 2006). Both McGinn (1997) and Winkler (1993) think most education systems will benefit from moving decision-making downward in the hierarchy, but only if conditions are right (see Chapter 2.3.3). Closeness to problems does not necessary mean capacity to solve them. If the local level lacks resources, is not prepared or willing, decentralization will fail to achieve the objects held for it. Educational reforms may have potential and good intentions, but if the implementation at school level is inadequate, the wanted outcome will not take place.

Educational decentralization policies are complex and manifold, and the literature regarding this topic is contradictory. There are numerous of arguments supporting these policies, and just as many pointing towards other factors that need to be in place to achieve high quality education. Research has been conducted in large scale on the subject of decentralization, but a lot of this research only looks at transition of authority from central level to municipality level or to school boards (in Canada), and not all the way to the school building. Others examine how school based management works within the domain schools are granted authority, without considering tasks where the decision-making power is situated elsewhere. In my study, there is uncertainty connected to the school autonomy level because the index

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calculated is only based upon the principal's perception. For future research, I would suggest to establish a more accurate measure for the school autonomy level, thus be able to identify the locus of authority for different tasks in the delivery of education. Then an assessment of which level is more suitable for which tasks can be presented for the specific country, not merely in terms of improved student achievement, but also regarding other responsibilities within the educational system, like equality, financial matters and democratization.

## 9. References

- Belfield, Clive R. and Henry M. Levin. (2002). *Education privatization: causes, consequences and planning implications*. Paris. UNESCO: International Institute for Educational Planning.
- Bottani, Norberto. (2000). *Autonomy and Decentralization. Between Hopes and Illusions. A Study of Reforms in Five European Countries*. Paper presented at the Annual Meeting of the American Educational Association, New Orleans, LA. April 2000.
- Bourdieu, Pierre & Jean C. Passeron. (1990). *Reproduction in Education, Society and Culture*. 2<sup>nd</sup> Edition. London: Sage Publications.
- Bray, Mark. (2003). Control of Education: Issues and Tensions in Centralization and Decentralization. In Arno, Robert F. and Carlos A. Torres (eds.): *Comparative Education. The Dialect of the Global and the Local*. Lanham, MD: Rowman & Littlefield.
- Bryman, Alan. (2004). *Social Research Methods*. 2<sup>nd</sup> Edition. New York: Oxford University Press Inc.
- Carnoy, Martin. (1999). *Globalization and educational reform: what planners need to know*. Paris. UNESCO: International Institute for Educational Planning.
- Carnoy, Martin and Diana Rhoten. (2002). What does globalization mean for educational change? A comparative approach. *Comparative Education Review*. Vol 46, No 1, pp: 1-9.
- Castells, Manuel. (1996). *The Rise of the Network Society*. 2<sup>nd</sup> Edition. London: Blackwell Publishers Ltd,
- CEA. Canadian Education Association. (2007). *Public education in Canada: Facts, trends, and attitudes*. Toronto, ON: Canadian Education Association.  
[http://www.cea-ace.ca/media/en/CEA-ACE\\_PubEd.07\\_E\\_FinalWEB.pdf](http://www.cea-ace.ca/media/en/CEA-ACE_PubEd.07_E_FinalWEB.pdf) 07.03.09
- CESC. Canadian Education Statistics Council. (2006). *Pan-Canadian Education Indicators Program*. <http://www.cesc.ca/pceipE.html> 07.03.09
- CCL. Canadian Council on Learning. (2009). *Changing our Schools: Implementing Successful Educational Reform*.  
<http://www.ccl-cca.ca/CCL/Reports/LessonsInLearning/LinL20090114EducationReform.htm> 07.03.09
- CIESIN. Center for International Earth Science Information Network. (2009). *The Online Sourcebook on Decentralization and Local Development*. Contributor: World Bank.  
[http://www.ciesin.org/decentralization/English/General/Different\\_forms.html](http://www.ciesin.org/decentralization/English/General/Different_forms.html) 10.02.09

- 
- CMEC. Council of Ministers of Education. Canada. (2008). *Learn Canada 2020*.  
<http://www.cmec.ca/Publications/Lists/Publications/Attachments/187/CMEC-2020-DECLARATION.en.pdf> 20.03.09
- CMEC. Council of Ministers of Education. Canada. (2009). *Programs & Initiatives*.  
<http://www.cmec.ca/Pages/Default.aspx> 20.03.09
- Coeyman, Marjorie. (2003). Twenty years after A Nation at Risk. *The Christian Science Monitor*. <http://www.csmonitor.com/2003/0422/p13s02-lepr.html> 20.03.09
- Coleman, James S. (1988). Social Capital in the Creation of Human Capital. *American Journal of Sociology*, Vol 94, No s1, pp 95-140.
- Cook, Thomas. (2007). School Based Management: A Concept of Modest Entitivity with Modest Results. *Journal of Personnel Evaluation in Education*. Vol 20, No 3-4, pp. 129-145
- Coulson, A. (1999). *Market Education. The unknown History*. New Brunswick and London: Social Philosophy and Policy Center and Transaction Publishers.
- Crossley, Michael and Keith Watson. (2003). *Comparative and International Research in Education: Globalisation, Context and Difference*. London and New York: Routledge Falmer.
- Dale, Roger. (1999). Specifying Globalization Effects on National Policy: A Focus on the Mechanisms. *Journal of Education Policy*, Vol 14, No 1, pp. 1-17.
- Daun, Holger. (2003). Market Forces and Decentralization in Sweden: Impetus for School Development or Threat to Comprehensiveness and equity? In Plank, David N. and Gary Sykes (eds.). *Choosing Choice. School Choice in International Perspective*. New York and London: Teachers College Press.
- DEEWR. Department of Education Employment and Workplace Relations. (2009). *School education summary*. [http://www.dest.gov.au/sectors/school\\_education/](http://www.dest.gov.au/sectors/school_education/) 02.03.09
- DEST. Department of Education, Science and Training. (2004). *Taking Schools to the next Level. The National Framework for Schools*.  
[http://www.dest.gov.au/NR/rdonlyres/C27528CB-7A88-40D8-957A-0ADF297B8073/4092/discussion\\_paper.pdf](http://www.dest.gov.au/NR/rdonlyres/C27528CB-7A88-40D8-957A-0ADF297B8073/4092/discussion_paper.pdf) 20.03.09
- Eurydice. (2007). *The Information Database on Education Systems in Europe*.  
<http://eacea.ec.europa.eu/portal/page/portal/Eurydice/EuryStructureResult> 08.03.09
- Eurydice. (2008). *National summary sheets on education systems in Europe and ongoing reforms*.  
<http://eacea.ec.europa.eu/portal/page/portal/Eurydice/PubContents?pubid=047EN&country=null> 21.03.09
- Fagerlind, Ingemar and Lawrence J. Saha. (1989). *Education and national development: A comparative perspective*. 2<sup>nd</sup> Edition. Oxford: Pergamon Press.



---

Fiske, Edward. (1996). *Decentralization of Education: Politics and Consensus*. Washington DC: The World Bank

[http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1099080000281/Dec\\_education\\_politics\\_consensus\\_EN96.pdf](http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1099080000281/Dec_education_politics_consensus_EN96.pdf)  
10.02.09

Fiske, Edward. (2000). *Education for All, Status and Trends 2000: Assessing Learning Achievement*. Paris: UNESCO

<http://unesdoc.unesco.org/images/0011/001198/119823e.pdf> 10.02.09

Fjellström, Camilla T., Kristian Ramstedt. (2007). Sweden. In *TIMMS 2007. Encyclopedia. A Guide to Mathematics and Science Education around the World*. Volume 2. M-Z and Benchmarking Participants. Boston: TIMSS & PIRLS International Study Center.

[http://timss.bc.edu/TIMSS2007/PDF/T07\\_Enc\\_V2.pdf](http://timss.bc.edu/TIMSS2007/PDF/T07_Enc_V2.pdf) 15.01.09

FNBE. Finnish National Board of Education. (2009a). *The Education System of Finland*

<http://www.oph.fi/english/SubPage.asp?path=447,4699> 04.03.09

FNBE. Finnish National Board of Education. (2009b). *Finland and PISA*.

<http://www.oph.fi/english/SubPage.asp?path=447,88611,65535> 21.03.09

Gammage, David T. (2008). Three Decades of Implementation of School Based Management in the Australian Capital Territory and Victoria in Australia. *International Journal of Educational Management*, Vol 22, No 7, pp. 664-675.

Giddens, Anthony. (1990). *The Consequences of Modernity*. Stanford: Stanford University Press.

Gurr, David and Lawrie Drysdale. (2007) Models of Successful School Leadership: Victorian Case Studies. In Leithwood, Ken and Chris Day (eds): *Successful School Leadership in Times of Change*. Toronto: Springer.

Gurría, Angel, OECD Secretary General. (2007a). UNESCO Ministerial Round Table on Education and Economic Development. Speech held in Paris, October 19, 2007.

[http://www.oecd.org/document/19/0,3343,en\\_2649\\_37455\\_39519763\\_1\\_1\\_1\\_37455,00.html](http://www.oecd.org/document/19/0,3343,en_2649_37455_39519763_1_1_1_37455,00.html)  
1 10.02.09

Gurría, Angel. Secretary General OECD. (2007b). *Launch of PISA 2006*. Speech held in Tokyo, Japan Press Club, December 04, 2007.

[http://www.oecd.org/document/35/0,3343,en\\_2649\\_34487\\_39722787\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/35/0,3343,en_2649_34487_39722787_1_1_1_1,00.html)  
10.02.09

Hannaway, Jane. (1993). Decentralization in Two School districts: Challenging the Standard Paradigm. In Hannaway, Jane and Martin Carnoy (eds.): *Decentralization and School Improvement. Can We Fulfill the Promise?* San Francisco: Jossey-Bass Publishers.

Hannaway, Jane and Martin Carnoy. (1993a). Preface. In Hannaway, Jane and Martin Carnoy (eds.): *Decentralization and School Improvement. Can We Fulfill the Promise?* San Francisco: Jossey-Bass Publishers

---

Hannaway, Jane and Martin Carnoy. (1993b). Epilogue: Reframing the Debate. In Hannaway, Jane and Martin Carnoy (eds.): *Decentralization and School Improvement. Can We Fulfill the Promise?* San Francisco: Jossey-Bass Publishers.

Henry, Miriam, Bob Lingard, Fazal Rizvi and Sandra Taylor. (1999). Working with/against Globalization in Education. *Journal of Educational Policy*. Vol 14, No 1, pp. 85-97.

Hernes, Gudmund (2001): Social trends and challenges for education. In UNESCO: *International institute for educational planning's medium term plan 2002-2007*, Paris: International Institute for Educational Planning.

Ho Sui-Chu, Ester & J. Douglas Willms. (1996). The Effects of Parental Involvement on Eight Grade Achievement. *Sociology of Education*, Vol 69, No 2, pp 126-141.  
<http://www.unb.ca/crisp/pdf/9603.pdf> 12.11.08

International Labour Organization. (2009). *International Standard Classification of Occupation*.  
[www.ilo.org/public/english/bureau/stat/isco/index.htm](http://www.ilo.org/public/english/bureau/stat/isco/index.htm) 24.03.09

Karlsen, Gustav. (2000). Decentralized centralism: Framework for a better understanding of governance in the field of education. *Journal of Education Policy*. Vol. 15, No 5, pp. 525-538

Kenway, Jane. (2008). The Ghosts of the School Curriculum: Past, Present and Future. Radford Lecture, Fremantle Australia, 2007. *The Australian Educational Research*, Vol 35, No 2, pp. 1-13

Kjærnsli, Marit, Svein Lie, Rolf Vegar Olsen, Astrid Roe, Are Turmo. (2004). *Rett spor eller ville veier? Norske elever prestasjoner i matematikk, naturfag og lesing i PISA 2003*. Oslo: Universitetsforlaget.

Kjærnsli, Marit, Svein Lie, Rolf Vegar Olsen, Astrid Roe. (2007). *Tid for Tunge Løft. Norske elever kompetanse i matematikk, naturfag og lesing i PISA 2006*. Oslo: Universitetsforlaget.

Lalancette, Diane, Laura Hawkes, and Richard DeMerchant. (2007). British Columbia, Canada. In *TIMSS 2007. Encyclopedia. A Guide to Mathematics and Science Education around the World*. Volume 1. A-L. Boston: TIMSS & PIRLS International Study Center.  
[http://timss.bc.edu/TIMSS2007/PDF/T07\\_Enc\\_V1.pdf](http://timss.bc.edu/TIMSS2007/PDF/T07_Enc_V1.pdf) 15.01.09

Lauglo, Jon. (1995). Forms of Decentralisation and their Implications for Education. *Comparative Education*. Vol.31, No 1, pp. 5-29.

Leadbeater, Charles. (2000). *Living on Thin Air – The New Economy*. London: Penguin Group.

Leithwood, Kenneth and Teresa Menzies. (1998). Forms and Effects of School-Based Management: A Review. *Educational Policy*, Vol 12, No. 3, pp 325-346.

---

Levin, Henry. (1989). Mapping the Economics of Education – An Introductory Essay. *Educational Researcher*, Vol 18, No 4, pp. 13-17.

Library of Parliament. (2004). *Canada's Immigration Program*.  
<http://www.parl.gc.ca/information/library/PRBpubs/bp190-e.htm> 07.03.09

Lie, Svein and Astrid Roe. (2003). Exploring Unity and Diversity of Nordic Reading Literacy Profiles. In Lie, Svein, Pirjo Linnakylä & Astrid Roe (eds.): *Northern Lights on PISA. Unity and Diversity in the Nordic Countries in PISA 2000*. Department of Teacher Education and School Development, University of Oslo.  
[http://www.pisa.no/nordisk\\_pisa2000/kap12.pdf](http://www.pisa.no/nordisk_pisa2000/kap12.pdf) 08.10.2008

Lundgren, Ulf P. (1990). Educational Policymaking, Decentralisation and Evaluation. In Granheim, Marit, Maurice Kogan & Ulf P. Lundgren (eds.). *Evaluation as Policymaking. Introducing Evaluation into a National Decentralized Educational System*. London. Jessica Kingsley Publishers.

Lykins, Chad R. and Stephen P. Heyneman. (2008). *The Federal Role in Education: Lessons from Australia, Germany, and Canada*. Washington DC. Vanderbilt University. Center on Education Policy.

Maslowski, Ralf, Jaap Scheerens and Hans Luyten. (2007). The Effect of School Autonomy and School Internal Decentralization on Students' Reading Literacy. *School Effectiveness and School Improvement*. Vol. 18, No. 3, pp. 303 – 334

MCEETYA. Ministerial Council on Education, Employment, Training, and Youth Affairs. (1999). *The Adelaide Declaration on National Goals for Schooling in the 21<sup>st</sup> Century*.  
[http://www.mceetya.edu.au/mceetya/adelaide\\_declaration.11576.html](http://www.mceetya.edu.au/mceetya/adelaide_declaration.11576.html) 02.03.09

MCEETYA. Ministerial Council on Education, Employment, Training and Youth Affairs. (2008). *The Melbourne Declaration on Educational Goals for Young Australians*  
[http://www.mceetya.edu.au/verve/\\_resources/National\\_Declaration\\_on\\_the\\_Educational\\_Goals\\_for\\_Young\\_Australians.pdf](http://www.mceetya.edu.au/verve/_resources/National_Declaration_on_the_Educational_Goals_for_Young_Australians.pdf) 03.03.09

MCEETYA. Ministerial Council on Education, Employment, Training and Youth Affairs. (2009). *Statements of Learning*.  
[http://www.mceetya.edu.au/mceetya/statements\\_of\\_learning.22835.html](http://www.mceetya.edu.au/mceetya/statements_of_learning.22835.html) 03.03.09

McGinn, Noel F. (1997). Not Decentralization but Integration. In Keith Watson, Celia Modgil, Sohan Modgil (eds.): *Power and Responsibility in Education*. London: Cassell

Miller, Robert, Ciaran Acton, Deirdre Fullerton & John Maltby. (2002). *SPSS for Social Scientists*. New York: Palgrave Macmillan

Ministry of Education and Research. (2003-2004). *Stortingsmelding nr 30 (2003-2004) Kultur for læring*.  
[St.meld. nr. 30 \(2003-2004\) Kultur for læring](http://www.mceetya.edu.au/mceetya/statements_of_learning.22835.html) 20.03.09.

- 
- Ministry of Education and Research. (2007). *Knowledge promotion*.  
[http://www.udir.no/templates/udir/TM\\_Artikkel.aspx?id=2376](http://www.udir.no/templates/udir/TM_Artikkel.aspx?id=2376) 21.03.09
- Ministry of Education and Research. (2009). *Primary and Lower Secondary Education*.  
<http://www.regjeringen.no/en/dep/kd/Selected-topics/compulsory-education.html?id=1408>  
21.03.09
- Murphy, Joseph and Lynn G. Beck. (1995). *School-based Management as School Reform*.  
Thousand Oaks, CA: Corwin Press.
- Møller, Jorunn. (2006). Hvilke svar gir forskning om god skoleledelse? In Møller, Jorunn og  
Otto L. Fuglesang (eds.): *Ledelse i anerkjente skoler*. Oslo. Universitetsforlaget.
- OECD (2004). *PISA 2003 Data Analysis Manual*  
<http://www.oecd.org/dataoecd/35/51/35004299.pdf> 04.11.2008
- OECD (2005a). *School Factors Related to Quality and Equity. Results from PISA 2000*.  
<http://www.pisa.oecd.org/dataoecd/15/20/34668095.pdf> 23.03.09
- OECD (2005b). *PISA 2003 Technical Report*.  
<http://www.oecd.org/dataoecd/49/60/35188570.pdf> 13.11.2008
- OECD (2005c). *School Questionnaire for PISA 2006*.  
[http://pisa2006.acer.edu.au/downloads/PISA06\\_School\\_questionnaire.pdf](http://pisa2006.acer.edu.au/downloads/PISA06_School_questionnaire.pdf) 13.11.2008
- OECD (2005d). *School Sampling Preparation Manual. PISA 2006 Main Study. Version One*.  
Paris: Organisation for Economic Co-Operation and Development.  
<http://www.pisa.oecd.org/dataoecd/55/55/39829698.pdf> 20.10. 2008
- OECD (2006). *Assessing Scientific, Reading and Mathematical Literacy. A Framework for  
PISA 2006*. <http://www.oecd.org/dataoecd/63/35/37464175.pdf> 07.11.2008
- OECD (2007a). *Executive Summary PISA 2006: Science Competencies for Tomorrow's  
World*. <http://www.oecd.org/dataoecd/15/13/39725224.pdf> 08.10.2008
- OECD (2007b). *PISA 2006. Science Competencies for Tomorrow's World. Volume 1:  
Analysis*. Paris: Organisation for Co-Operation and Development.
- OECD (2007c). *PISA 2006. Volume 2: Data*. Paris: Organisation for Economic Co-  
Operation and Development.
- OECD (2007d). *Technical Standards for PISA 2006*  
<http://www.pisa.oecd.org/dataoecd/57/24/39736696.pdf> 20.10.2008
- Onstad, Torgeir and Liv Sissel Grønmo. (2007). Norway. In *TIMMS 2007. Encyclopedia. A  
Guide to Mathematics and Science Education around the World. Volume 2. M-Z and  
Benchmarking Participants*. Boston: TIMSS & PIRLS International Study Center.  
[http://timss.bc.edu/TIMSS2007/PDF/T07\\_Enc\\_V2.pdf](http://timss.bc.edu/TIMSS2007/PDF/T07_Enc_V2.pdf) 15.01.09

---

O'Sullivan, Brian. (1999). Global Change and Educational Reform in Ontario and Canada. *Canadian Journal of Education*, Vol 24, No 3, pp. 311–325

Pallant, Julie. (2007). *SPSS Survival Manual. A Step by Step Guide to Data Analysis using SPSS for Windows*. 3<sup>rd</sup> Edition. Berkshire: Open University Press.

Patrinos, Harry A. and David L. Ariasingam. (1997). *Decentralization of Education: Demand-Side Financing*. Washington DC: The World Bank.  
[http://www.unescobkk.org/fileadmin/user\\_upload/epr/MTEF/02Education\\_Financing\\_and\\_Budgeting/02Financing\\_Public\\_and\\_Private\\_Funding/020216003Patrinos,%20H.%20A.%20and%20Ariasingam,%20D.%20L.%20\(1997\).pdf](http://www.unescobkk.org/fileadmin/user_upload/epr/MTEF/02Education_Financing_and_Budgeting/02Financing_Public_and_Private_Funding/020216003Patrinos,%20H.%20A.%20and%20Ariasingam,%20D.%20L.%20(1997).pdf) 20.03.09

Rinne, Risto, Joel Kivirauma and Hannu Simola. (2002). Shoots of revisionist education policy or just slow readjustment? The Finnish case of educational reconstruction. *Journal of Education Policy*, Vol 17, No 6, pp. 643-658.

Robinson, Peter. (1999). The Tyranny of League Tables: International Comparisons of Educational Attainment and Economic Performance. In Alexander, Robin, Patricia Broadfoot and David Phillips (eds.): *Learning from Comparing. New Directions in Comparative Educational Research. Vol 1*. Oxford: Symposium Books.

Scholte, Jan A. (2000). *Globalization. A critical introduction*. London: Palgrave.

Schultz, Theodore. (1993). The Economic Importance of Human Capital in Modernisation. *Education Economics*. Vol 1, No 1, pp. 13-19.

Scoppio, Grazia. (2002). Common Trends of Standardisation, Accountability, Devolution and Choice in the Educational Policies of England, U.K., California, U.S.A, and Ontario, Canada. *Comparative Education*, Vol.2, No 2, pp. 130-141  
<http://www.tc.columbia.edu/cice/Archives/2.2/22scoppio.pdf>

SNAE. Swedish National Agency for Education. (2006). *Curriculum for the compulsory school system, the pre-school class and the leisure-time center– Lpo 94*  
<http://www.skolverket.se/sb/d/493/a/1303> 08.03.09

SNAE. Swedish National Agency for Education. (2009). *Grundskola*.  
<http://www.skolverket.se/sb/d/2386> 08.03.09  
<http://www.skolverket.se/sb/d/2574;jsessionid=ECD9C5B07C43556370681AB42D0CFF26>  
 08.03.09

Store Norske Leksikon. (2009). *Australia*.  
[http://www.snl.no/Australia/historie\\_%E2%80%93\\_2](http://www.snl.no/Australia/historie_%E2%80%93_2) 03.03.09

Tabachnick, Barbara & Linda Fidell. (2001). *Using Multivariate Statistics*. 4<sup>th</sup> Edition. Needham Heights, MA: Allyn & Bacon.

Teixeira, Pedro N. (2000). A Portrait of the Economics of Education, 1960-1997. *History of Political Economy*, Vol. 32, No 4, pp. 257-287

---

Telhaug, Alfred Oftedal. (1997). *Utdanningsreformene. Oversikt og analyse*. Oslo: Didakta Norsk Forlag AS.

Thomson, Sue, John Ainley, Marina Nicholas. (2007). Australia. In *TIMMS 2007. Encyclopedia. A Guide to Mathematics and Science Education Around the World. Volume 1. A-L*. Boston: TIMSS & PIRLS International Study Center  
[http://timss.bc.edu/TIMSS2007/PDF/T07\\_Enc\\_V1.pdf](http://timss.bc.edu/TIMSS2007/PDF/T07_Enc_V1.pdf) 15.01.09

Trow, Martin. (1996). Trust, Markets and Accountability in Higher Education: A Comparative Perspective. *Higher Education Policy*, Vol 9, No 4, pp. 309-324.

Tyack, David. (1993). School Governance in the United States: Historical Puzzles and Anomalies. In Hannaway, Jane and Martin Carnoy (eds.): *Decentralization and School Improvement. Can We Fulfil the Promise?* San Francisco. Jossey-Bass Publishers

Walker, Richard, Pin Yang and John Rymer. (2007). Alberta, Canada. In *TIMMS 2007. Encyclopedia. A Guide to Mathematics and Science Education around the World. Volume 1. A-L*. Boston: TIMSS & PIRLS International Study Center  
[http://timss.bc.edu/TIMSS2007/PDF/T07\\_Enc\\_V1.pdf](http://timss.bc.edu/TIMSS2007/PDF/T07_Enc_V1.pdf) 15.01.09

Watson, Keith, Celia Modgil, Sohan Modgil. (1997). The Control of Education: Where does Power Lie? In Keith Watson, Celia Modgil, Sohan Modgil (eds.): *Power and Responsibility in Education*. London: Cassell.

Weiler, Hans N. (1993). Control Versus Legitimation: The Politics of Ambivalence. In Hannaway, Jane and Martin Carnoy (eds.): *Decentralization and School Improvement. Can We Fulfil the Promise?* San Francisco: Jossey-Bass Publishers.

Winkler, Donald R. (1993). Fiscal Decentralization and Accountability in Education: Experiences in Four Countries. In Hannaway, Jane and Martin Carnoy (eds.): *Decentralization and School Improvement. Can We Fulfil the Promise?* San Francisco: Jossey-Bass Publishers.

Woessmann, Ludger. (2001). Why Students in Some Countries Do Better. In *Education matters*. Vol 1, No 2. [www.hoover.org/publications/ednext/3389816.html](http://www.hoover.org/publications/ednext/3389816.html) 01.04.2009.

World Bank. (2007). *What is School Based management?*  
[http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1099079934475/547667-1145313948551/what\\_is\\_SBM.pdf](http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1099079934475/547667-1145313948551/what_is_SBM.pdf)  
08.02.09

## **Appendices**

- A. PISA 2006 Science Scale
- B. Questionnaire Regarding School Level Autonomy; Q11 and Q12
- C. Syntax. Recoding of Authority Level.
- D. Factor Analysis for School Autonomy, Q11

## Appendix A

| PISA 2006 Science scale |            |                    |
|-------------------------|------------|--------------------|
| Country                 | Mean score | Standard deviation |
| <b>Finland</b>          | <b>563</b> | <b>86</b>          |
| Hong Kong-China         | 542        | 92                 |
| <b>Canada</b>           | <b>534</b> | <b>94</b>          |
| Chinese Taipei          | 532        | 94                 |
| Estonia                 | 531        | 84                 |
| Japan                   | 531        | 100                |
| New Zealand             | 530        | 107                |
| <b>Australia</b>        | <b>527</b> | <b>100</b>         |
| Netherlands             | 525        | 96                 |
| Liechtenstein           | 522        | 97                 |
| Korea                   | 522        | 90                 |
| Slovenia                | 519        | 98                 |
| Germany                 | 516        | 100                |
| United Kingdom          | 515        | 107                |
| Czech Republic          | 513        | 98                 |
| Switzerland             | 512        | 99                 |
| Macao-China             | 511        | 78                 |
| Austria                 | 511        | 98                 |
| Belgium                 | 510        | 100                |
| Ireland                 | 508        | 94                 |
| Hungary                 | 504        | 88                 |
| <b>Sweden</b>           | <b>503</b> | <b>94</b>          |
| <b>OECD mean</b>        | <b>500</b> | <b>95</b>          |
| Poland                  | 498        | 90                 |
| Denmark                 | 496        | 93                 |
| France                  | 495        | 102                |
| Croatia                 | 493        | 86                 |
| Iceland                 | 491        | 97                 |
| Latvia                  | 490        | 84                 |
| United States           | 489        | 106                |
| Slovak Republic         | 488        | 93                 |
| Spain                   | 488        | 91                 |
| Lithuania               | 488        | 90                 |
| <b>Norway</b>           | <b>487</b> | <b>96</b>          |
| Luxembourg              | 486        | 97                 |
| Russian Federation      | 479        | 90                 |
| Italy                   | 475        | 96                 |
| Portugal                | 474        | 89                 |
| Greece                  | 473        | 92                 |
| Israel                  | 454        | 111                |
| Chile                   | 438        | 92                 |
| Serbia                  | 436        | 85                 |
| Bulgaria                | 434        | 107                |
| Uruguay                 | 428        | 94                 |
| Turkey                  | 424        | 83                 |
| Jordan                  | 422        | 90                 |
| Thailand                | 421        | 77                 |
| Romania                 | 418        | 81                 |
| Montenegro              | 412        | 80                 |
| Mexico                  | 410        | 81                 |
| Indonesia               | 393        | 70                 |
| Argentina               | 391        | 101                |
| Brazil                  | 390        | 89                 |
| Colombia                | 388        | 85                 |
| Tunisia                 | 386        | 82                 |
| Azerbaijan              | 382        | 56                 |
| Qatar                   | 349        | 84                 |
| Kyrgyzstan              | 322        | 84                 |

Standard deviation: Between-student variance in score

Source: Kjærnsli et al. Tid for Tunge Løft.

<http://www.pisa.no/pdf/Chapter1and11PISA2006.pdf>



## Appendix B

This appendix contains the two set of questions regarding locus of authority, answered by the principal at each sampled school in the PISA survey and employed in the study as a measure for the school's autonomy level (see Chapters 6.1.2 and 6.1.6)

Source: [http://pisa2006.acer.edu.au/downloads/PISA06\\_School\\_questionnaire.pdf](http://pisa2006.acer.edu.au/downloads/PISA06_School_questionnaire.pdf) 13.04.09

### Q11 Regarding your school, who has a considerable responsibility for the following tasks?

(Please tick as many boxes as appropriate in each row)

|  | <i>Principal or Teachers</i> | <i>&lt;School governing board&gt;</i> | <i>&lt;Regional or local education authority&gt;</i> | <i>National education authority</i> |
|--|------------------------------|---------------------------------------|--|-------------------------------------|
| a) Selecting teachers for hire                       | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| b) Firing teachers                                   | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| c) Establishing teachers' starting salaries          | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| d) Determining teachers' salaries increases          | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| e) Formulating the school budget                     | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| f) Deciding on budget allocations within the schools | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| g) Establishing student disciplinary policies        | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| h) Establishing student assessment policies          | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| i) Approving students for admission to the school    | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| j) Choosing which textbooks are used                 | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| k) Determining course content                        | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |
| l) Deciding which course are offered                 | <input type="checkbox"/>     | <input type="checkbox"/>              | <input type="checkbox"/>                             | <input type="checkbox"/>            |

---

**Q12 Regarding your school, which of the following bodies exert a direct influence on decision-making about staffing, budgeting, instructional content and assessment practices?**

*(Please tick as many boxes as apply)*

|  | <i>Area of influence</i> |                          |                              |                             |
|--|--------------------------|--------------------------|------------------------------|-----------------------------|
|  | <i>Staffing</i>          | <i>Budgeting</i>         | <i>Instructional content</i> | <i>Assessment practices</i> |
| a) Regional or national educational authorities (e.g. inspectorates)           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/>    |
| b) The school's <governing board>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/>    |
| c) Parent groups   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/>    |
| d) Teacher groups (e.g. Staff Association, curriculum committees, trade union) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/>    |
| e) Student groups (e.g. Student Association, youth organisation)               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/>    |
| f) External examination boards   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/>    |

## Appendix C

### Syntax. Recoding of Authority Level

This appendix contains the recoding of the four authority levels from Q11 (Appendix B). First, the authority levels were divided into two groups in order to distinguish between central and local level authority.

Regional/local education authority (3) and National education authority (4) = Central level authority.

Principal/teachers (1) and School governing board (2) = Local level authority.

The label Q11b2 then indicates item b; Firing teachers, and authority level 2; School governing board.

The responses from the principals are initially coded *Yes*=1 for those ticked and *No*=2 if not ticked, but were recoded into *Yes* = -1 for those who ticked for Central level authority and *Yes* = 3 for those who ticked for Local level authority. *No* was recoded into 0 for both levels.

Then the four authority levels were computed for each item (a-1). This revealed 8 possible combinations ranging from -2 to 6. Thus, a second recoding was necessary to express the authority level by three categories; 1, 2 and 3, where 1 represents Central level authority, 2 represents a mixed level authority where the central and local authorities are equally responsible and 3 represents the highest level of local autonomy (see Chapter 6.1.2).

#### ***1. RECODING:***

```
RECODE SC11Qa1 SC11Qa2 SC11Qb1 SC11Qb2 SC11Qc1 SC11Qc2 SC11Qd1 SC11Qd2
SC11Qe1 SC11Qe2 SC11Qf1 SC11Qf2 SC11Qg1 SC11Qg2 SC11Qh1 SC11Qh2 SC11Qi1
SC11Qi2 SC11Qj1 SC11Qj2 SC11Qk1 SC11Qk2 SC11Ql1 SC11Ql2 (2=0) (1=3)
(ELSE=SYSMIS) INTO Q11a1 Q11a2 Q11b1 Q11b2 Q11c1 Q11c2 Q11d1 Q11d2 Q11e1
Q11e2 Q11f1 Q11f2 Q11g1 Q11g2 Q11h1 Q11h2 Q11i1 Q11i2 Q11j1 Q11j2 Q11k1 Q11k2
Q11l1 Q11l2.
```

```
VARIABLE LABELS Q11a1 'Hire-Princ/teacher' /Q11a2 'Hire-Schoolboard' /Q11b1
'Firing princ/teacher' /Q11b2 'Firing Schoolboard' /Q11c1 'Est salaries princ/teacher' /Q11c2
'Est salaries Schoolboard' /Q11d1 'Salary incr Princ/teacher' /Q11d2 'Salary incr
Schoolboard' /Q11e1 'Form budget '+' 'Principal/teacher' /Q11e2 'Form budget Schoolboard'
/Q11f1 'Budget allocation Princ/teacher' /Q11f2 'Budget allocation Schoolboard' /Q11g1
'Discipline Princ/teacher' /Q11g2 'Discipline '+' 'Schoolboard' /Q11h1 'Assessment
Princ/teacher' /Q11h2 'Assessment Schoolboard' /Q11i1 'Admission Princ/teacher' /Q11i2
'Admission Schoolboard' /Q11j1 'Textbooks Princ/teacher' /Q11j2 'Textbooks Schoolboard'
/Q11k1 'Course content Princ/teacher' /Q11k2 'Course content Schoolboards' /Q11l1 'Course
offered Princ/teacher' /Q11l2 'Course offered Schoolboard'.
```

```
EXECUTE.
```

```
RECODE SC11Qa3 SC11Qa4 SC11Qb3 SC11Qb4 SC11Qc3 SC11Qc4 SC11Qd3 SC11Qd4
SC11Qe3 SC11Qe4 SC11Qf3 SC11Qf4 SC11Qg3 SC11Qg4 SC11Qh3 SC11Qh4 SC11Qi3
SC11Qi4 SC11Qj3 SC11Qj4 SC11Qk3 SC11Qk4 SC11Ql3 SC11Ql4 (2=0) (1=-1)
(ELSE=SYSMIS) INTO Q11a3 Q11a4 Q11b3 Q11b4 Q11c3 Q11c4 Q11d3 Q11d4 Q11e3
```

Q11e4 Q11f3 Q11f4 Q11g3 Q11g4 Q11h3 Q11h4 Q11i3 Q11i4 Q11j3 Q11j4 Q11k3 Q11k4  
Q11l3 Q11l4.

VARIABLE LABELS Q11a3 'Hire Intermediate' /Q11a4 'Hire Central' /Q11b3 'Firing  
Intermediate' /Q11b4 'Firing Central' /Q11c3 'Est salaries Intermediate' /Q11c4 'Est salaries  
Central' /Q11d3 'Salary incr Intermediate' /Q11d4 'Salary incr Central' /Q11e3 'Form budget  
Intermediate' /Q11e4 'Form budget Central' /Q11f3 'Budget allocation Intermediate' /Q11f4  
'Budget allocation Central' /Q11g3 'Discipline Intermediate' /Q11g4 'Discipline Central'  
/Q11h3 'Assessment Intermediate' /Q11h4 'Assessment Central' /Q11i3 'Admission  
Intermediate' /Q11i4 'Admission Central' /Q11j3 'Textbooks Intermediate' /Q11j4 'Textbooks  
Central' /Q11k3 'Course content Intermediate' /Q11k4 'Course content Central' /Q11l3  
'Course offered Intermediate' /Q11l4 'Course offered Central'.

EXECUTE.

COMPUTE Q11aAut=Q11a1 + Q11a2 + Q11a3 + Q11a4.

EXECUTE.

COMPUTE Q11bAut=Q11b1 + Q11b2 + Q11b3 + Q11b4.

EXECUTE.

COMPUTE Q11cAut=Q11c1 + Q11c2 + Q11c3 + Q11c4.

EXECUTE.

COMPUTE Q11dAut=Q11d1 + Q11d2 + Q11d3 + Q11d4.

EXECUTE.

COMPUTE Q11eAut=Q11e1 + Q11e2 + Q11e3 + Q11e4.

EXECUTE.

COMPUTE Q11fAut=Q11f1 + Q11f2 + Q11f3 + Q11f4.

EXECUTE.

COMPUTE Q11gAut=Q11g1 + Q11g2 + Q11g3 + Q11g4.

EXECUTE.

COMPUTE Q11hAut=Q11h1 + Q11h2 + Q11h3 + Q11h4.

EXECUTE.

COMPUTE Q11iAut=Q11i1 + Q11i2 + Q11i3 + Q11i4.

EXECUTE.

COMPUTE Q11jAut=Q11j1 + Q11j2 + Q11j3 + Q11j4.

EXECUTE.

COMPUTE Q11kAut=Q11k1 + Q11k2 + Q11k3 + Q11k4.

EXECUTE.

COMPUTE Q11lAut=Q11l1 + Q11l2 + Q11l3 + Q11l4.

EXECUTE.

## **2. RECODING:**

RECODE Q11aAut Q11bAut Q11cAut Q11dAut Q11eAut Q11fAut Q11gAut Q11hAut  
Q11iAut Q11jAut Q11kAut Q11lAut (-1=1) (-2=1) (1=2) (2=2) (4=2) (5=2) (3=3) (6=3)  
INTO Q11aNY Q11bNY Q11cNY Q11dNY Q11eNY Q11fNY Q11gNY Q11hNY Q11iNY  
Q11jNY Q11kNY Q11lNY.

VARIABLE LABELS Q11aNY 'Hire teachers' /Q11bNY 'Fire teachers' /Q11cNY  
'Establishing teacher salaries' /Q11dNY 'Determine salary increases' /Q11eNY 'Formulate  
schoolbudget' /Q11fNY 'Budget allocations' /Q11gNY 'Student discipline' /Q11hNY 'Student  
assessment' /Q11iNY 'Student admission' /Q11jNY 'Textbooks' /Q11kNY 'Course content'  
/Q11lNY 'Course offered'.

EXECUTE.

---

## Appendix D

### Factor Analyses for School Autonomy; Q 11

The set of questions at which the level of school autonomy is based, Q11, contains twelve items (appendix B). Factor analysis is performed for all the countries, both combined and separately, to reduce the scale items to a smaller number of factors (see Chapter 6.1.3). For Sweden Textbooks have zero variance (100% school autonomy), and in order to get some result I had to remove Textbooks and run the analysis over again. The factor analyses are performed with Varimax rotation, Missing values pairwise and Suppress values < 0.30.

Table 6.1 All 5 countries combined

|                               | Component |      |
|-------------------------------|-----------|------|
|                               | 1         | 2    |
| Hire teachers                 | .685      |      |
| Fire teachers                 | .770      |      |
| Establishing teacher salaries | .849      |      |
| Determine salary increases    | .859      |      |
| Formulate schoolbudget        | .395      | .512 |
| Budget allocations            |           | .489 |
| Student discipline            |           | .629 |
| Student assessment            |           | .629 |
| Student admission             |           | .459 |
| Textbooks                     |           | .700 |
| Course content                |           | .624 |
| Course offered                |           | .574 |

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

---

Table 6.1a Australia

---

Rotated Component Matrix<sup>a,b</sup>

---

|                               | Component |      |
|-------------------------------|-----------|------|
|                               | 1         | 2    |
| Hire teachers                 | .664      |      |
| Fire teachers                 | .781      |      |
| Establishing teacher salaries | .874      |      |
| Determine salary increases    | .846      |      |
| Formulate schoolbudget        | .299      | .444 |
| Budget allocations            |           | .655 |
| Student discipline            |           | .676 |
| Student assessment            |           | .612 |
| Student admission             | .321      | .490 |
| Textbooks                     |           | .658 |
| Course content                |           | .390 |
| Course offered                |           | .645 |

---

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser  
 Normalization.

a. Country code 3-character = **Australia**

b. Rotation converged in 3 iterations.

---

Table 6.1b Canada

---

Rotated Component Matrix<sup>a,b</sup>

---

|                               | Component |      |
|-------------------------------|-----------|------|
|                               | 1         | 2    |
| Hire teachers                 | .483      |      |
| Fire teachers                 | .739      |      |
| Establishing teacher salaries | .926      |      |
| Determine salary increases    | .915      |      |
| Formulate schoolbudget        | .441      | .489 |
| Budget allocations            |           | .497 |
| Student discipline            |           | .654 |
| Student assessment            |           | .552 |
| Student admission             |           | .551 |
| Textbooks                     |           | .656 |
| Course content                | .348      | .447 |
| Course offered                |           | .546 |

---

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser  
 Normalization.

a. Country code 3-character = **Canada**

b. Rotation converged in 3 iterations.

---

Table 6.1c Finland

|                               | Component |      |
|-------------------------------|-----------|------|
|                               | 1         | 2    |
| Hire teachers                 | .717      |      |
| Fire teachers                 | .762      |      |
| Establishing teacher salaries | .669      |      |
| Determine salary increases    | .738      |      |
| Formulate schoolbudget        | .466      |      |
| Budget allocations            |           | .507 |
| Student discipline            |           | .596 |
| Student assessment            |           | .691 |
| Student admission             | .301      | .525 |
| Textbooks                     |           | .482 |
| Course content                | .363      | .322 |
| Course offered                |           | .527 |

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.

a. Country code 3-character = **Finland**

b. Rotation converged in 3 iterations.

Table 6.1d Norway

|                               | Component |      |
|-------------------------------|-----------|------|
|                               | 1         | 2    |
| Hire teachers                 | .765      |      |
| Fire teachers                 | .716      |      |
| Establishing teacher salaries | .663      |      |
| Determine salary increases    | .724      |      |
| Formulate schoolbudget        | .550      |      |
| Budget allocations            | .306      |      |
| Student discipline            |           |      |
| Student assessment            |           | .565 |
| Student admission             | .622      |      |
| Textbooks                     |           |      |
| Course content                |           | .816 |
| Course offered                |           | .725 |

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.

a. Country code 3-character = **Norway**

b. Rotation converged in 2 iterations.

Table 6.1e Sweden

Rotated Component Matrix<sup>a,b</sup>

|                               | Component |      |
|-------------------------------|-----------|------|
|                               | 1         | 2    |
| Hire teachers                 | .316      |      |
| Fire teachers                 | .392      |      |
| Establishing teacher salaries | .696      |      |
| Determine salary increases    | .832      |      |
| Formulate schoolbudget        | .704      |      |
| Budget allocations            | .457      |      |
| Student discipline            |           |      |
| Student assessment            |           | .597 |
| Student admission             |           | .347 |
| Course content                |           | .822 |
| Course offered                |           | .820 |

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser  
 Normalization.

a. Country code 3-character = **Sweden**

b. Rotation converged in 3 iterations.

### Warnings

For split file Country code 3-character = Sweden, there are fewer than two cases, at least one of the variables has zero variance, there is only one variable in the analysis, or correlation coefficients could not be computed for all pairs of variables. No further statistics will be computed for this split file.