

**Design and use of management accounting  
and control systems in Norwegian primary  
and lower secondary education**

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**Dissertation submitted to the  
Department of Auditing, Law and Accounting at the  
Norwegian School of Economics and Business Administration  
for the degree of Dr. Oecon**

**Norwegian School of Economics AND Business  
Administration**

**Bergen, Norway 2008**



# Preface

My interest for management accounting and control in schools was formed when I was an upper secondary teacher for one year more than 20 years ago. This interest was further encouraged during the years I worked for Agder Research. Over these years I had the pleasure to participate in school performance measurement developing networks and projects at local government level along with other school projects.

Many individuals and institutions have in different ways contributed to my work on this thesis and made it possible for me to fulfil my dream with regard to research on management accounting and control in schools. Therefore, I want to express the following gratitude:

First of all, I would like to express my gratitude to my supervisor Professor Trond Bjørnenak at the Norwegian School of Economics and Business Administration for his inspiring and professional supervision, for his encouragement and positive attitude to my work and ideas, for his capability to “move the bar upwards” as I have progressed, and for his support through ups and downs. My thanks also to the other members of my advisory committee, Professor Frøystein Gjesdal at the Norwegian School of Economics and Business Administration and Hans Bonesrønning at the Norwegian University of Science and Technology for constructive advice and comments.

During my work with this thesis I have had the privilege of being engaged as a research fellow at the University of Agder and I have been a doctoral student at the Department of Accounting, Auditing and Law at the Norwegian School of Economics and Business Administration. This thesis had not been possible without the financial support from the Development Fund of Southern Norway (Sørlandets Kompetansefond) and the University of Agder. I gratefully acknowledge these institutions for their support.

To make research may be a lonely and sometimes frustrating process. Therefore, I appreciate the support and encouragement from colleges and friends at the University of Agder and I am deeply grateful for their patience when I needed to discuss thoughts and ideas.

Lastly, my sincerest thanks to my best friend and husband Bjørn and to our children Sindre, Kjetil and Gaute for their encouragement, understanding and support during these years.

Liv Bente Hannevik Friestad

Kristiansand, January 2008

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# Introduction, conclusions and policy implications

*In recent years schools have been exposed to New Public Management inspired reforms intended to increase school efficiency. To achieve this intended effect, the reforms might cause changes in actions and efforts performed by schools and school employees as well as changes in management accounting and control systems used by schools and school authorities. This dissertation addresses management accounting and control in schools and its overall objective is to study design and use of management accounting and control in Norwegian schools and education. The dissertation consists of four essays with different theoretical and methodological approaches. The overall impression from the essays is that management accounting research concerning schools and education is limited and biased compared with issues expected to be studied by management accountants. Furthermore, the impression is that management accounting and control systems used in Norwegian schools and education are simple and limited, and that the design and use of school management accounting and control systems are not in accordance with normative management accounting and control theory. With respect to implications for practice, it is proposed that school output measures in school output control systems should be supplemented with school activity measures and that these measures are controlled in the same way as the schools financial measures are controlled by their local school authorities.*

## **Introduction**

Management control is defined as, “the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization’s objectives” (Anthony, 1965, p17). Managers and higher authorities use management accounting information and management control systems to “maintain or alter patterns in organizational activities” (Simons, 1995b). In addition, management control systems are used to choose, communicate and implement strategy, to secure goal congruence, to motivate managers and employees to work towards an organisation’s overall goals (attention directing), for problem solving (decisions) and for performance control (scorekeeping) (e.g. Anthony & Govindarajan, 2001; Anthony & Young, 2003; Horngren, Datar & Foster, 2003; Kaplan & Norton, 1996; Malina & Selto, 2001).

The overall objective of public services is normally to provide the best possible services using the resources that are available (e.g. Anthony & Young, 2003) . Since the 1970s, New Public Management (NPM) inspired reforms have been introduced to public services around the world (e.g. Gruening, 2001) with the aims of increased effectiveness and efficiency in the production of public services and consequently more or better services for the available resources (e.g. Olson, Guthrie, & Humphrey, 1998b). A greater focus on standards, measures and output control, greater competition, greater discipline and parsimony in resource use and relaxed input control, for instance by the introduction of devolved financial management, are examples of the reforms and changes inspired by the New Public Management (e.g. Hood, 1991; Olson et al., 1998b).

It is reasonable to assume that, if the reforms should have the expected effect with regard to efficiency and effectiveness, they should encourage changes in organisational and/or individual actions and efforts. Furthermore, taking into account that managers use management control systems to “maintain or alter patterns in organizational activities” (Simons, 1995b), it is reasonable to assume that the design and use of internal management control systems might play a role with respect to the

effects of the reforms; and that the reforms might make new or altered demands on management control systems. However, it is possible that the reforms may not have the desired effects, at least not in the short run. Organisations may resist changes (e.g. Oliver, 1991), be hesitant with respect to the introduction of reforms (Mellemvik & Pettersen, 1998) or they may protect themselves from the effects of reforms (e.g. Broadbent & Laughlin, 1998). In addition, reforms may be implemented in incremental steps (Wildavsky, 1978).

Some examples of implemented or proposed NPM-inspired school reforms are a reduction in school input control, the introduction of block grants and financial management at schools and increased competition through the introduction of free school choice. The effects of such reforms, as well as the school production process, school costs and school productivity have been studied by economists for decades (Hanushek, 2002). However, school economics research tends to study overall relationships and effects of reforms. School economists have given little attention to how reforms affect processes, systems and procedures within schools; in other words, school economics tends to consider schools as “black boxes”.

The familiarity of management accountants “with the systems, structures and management processes of actual enterprises” is claimed to be their comparative advantage over economists (Kaplan, 2006, p130). This advantage is reflected in traditional as well as more recent approaches to cost and performance measurement and management, such as activity-based costing and the balanced scorecard (Kaplan, 2006). In addition, the familiarity of management accountants with what is going on inside organisations is reflected in their use of and focus on case/field studies (Ahrens & Dent, 1998; Shields, 1997). However, in general management accounting research has given limited attention to public sector (Scapens & Bromwich, 2001; Shields, 1997), and possibly even less attention to schools and school-related issues.

Comparison between countries has revealed that even if Norway is one of the OECD countries that use the most resources per pupil, the achievements of those pupils in basic subjects are only about at the same level as the average of the OECD countries (OECD, 2004, 2007; UFD, 2003b). To encourage schools to use their resources more effectively and efficiently (UFD, 2003b), and to facilitate school quality and improved

learning for individual pupils at all levels of Norwegian primary and secondary schools,<sup>1</sup> both central and local, school authorities have relaxed their use of input control in favour of New Public Management-inspired school reforms. In 2003, the former, rigid class-size regulations were replaced with vague recommendations on how pupils and teaching activities could be organised in groups (The Norwegian Education Act, 1998). In addition, several municipalities have replaced their former detailed line-item school budgets with block grants and financial management (devolved financial management) (Opedal, Stigen, & Laudal, 2002).

It is reasonable to assume that the removal of the previously detailed school input control, including the line-item budgets and rigid class size regulations, and the introduction of devolved financial management, would have altered or added the demands on the management accounting information and management control systems used both in schools and by central and local school authorities. It is also reasonable to assume that in order to improve school efficiency, schools have to make changes in how they allocate their resources on different input factors and activities and how they organise teaching activities, as well as revising the actions and efforts of schools and their employees. In addition, one should expect that the reforms undertaken might affect the allocation of school resources to individual schools and the way the local school authorities control schools.

The poor performances despite their large resources of the Norwegian schools when compared to the OECD countries (OECD, 2004, 2007), alongside the recent Norwegian school reforms and limited management accounting research on schools, have created an interest in management control and management control systems in both schools and central and local school authorities. This focuses on how schools and school authorities use management accounting information and management control systems, whether and how schools and local school authorities respond to the changes made by their superior authorities, as well as an interest in whether school output and activity measures are useful for management control of schools. *Consequently, the overall objective of the present dissertation is to study the design and use of management control systems in Norwegian primary and lower secondary education.*

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<sup>1</sup> <http://www.skoleporten.no/templates/Page.aspx?id=17014&epslanguage=NO#Bakgrunn>.

This overall objective has resulted in four studies with different objectives, theoretical frameworks and research approaches. The objectives of this introduction section are: 1) to sum up and discuss the dissertation's contributions to management accounting research on schools and education, as well as to management accounting research in general; and 2) to discuss the political and managerial implications of the results and findings.

The first essay in this dissertation reveals that management accounting research on schools is limited, and consequently that research on management control systems within schools, and on how these are used by superior authorities to control systems, is also limited. Therefore, even if different methodological approaches are applied in the four essays, this dissertation can largely be described as a descriptive/explorative study of the design and use of management control systems in education.

The next section sums up the objectives, the theoretical and methodological approaches applied and the findings and theoretical contributions from the four studies and the dissertation as a whole; while some policy implications of the results and findings are discussed in section three. The fourth section makes some proposals for future management accounting research with regard to schools and education.

## **The four essays**

Based on rational basic microeconomic theory, in order to be more effective and efficient, organisations and individuals exposed to reforms have to alter their actions and efforts, as well as making changes to how resources are allocated and used. In addition, relaxed input control and local financial management may make new or altered demands on management accounting and control systems at both the school level and at higher organisational levels. However, the changes and reforms may not have the expected effects. Organisations and individuals may be hesitant about (Mellempvik & Pettersen, 1998) or even resistant to (e.g. Broadbent & Laughlin, 1998; Oliver, 1991) changes, while organisations may make arrangements to protect themselves and their core activities from the effects of reforms. For instance, organisations or managers may decouple operational activities from strategies and

plans communicated to external stakeholders (Brunsson, 1989) and/or establish “absorption groups” or other mechanisms to absorb the effects of reforms, thereby protecting their core activities (e.g. Broadbent & Laughlin, 1998; Laughlin, Broadbent, Shearn & Villig-Atherton, 1994).

Three of the four essays in this dissertation discuss school management control systems or elements of these systems. The second essay discusses school performance measurement and whether school output measures provide trustworthy information about the performances of schools and their employees, while the third and fourth essays study management control systems used in schools and by school authorities and whether the recent reforms have affected the use and design of management control systems. Essay three studies how and whether local school authorities have altered their school resource allocation formula and their actual allocation of school resources after the removal of the class-size regulations from the Norwegian Education Act (1998), while essay four investigates the design and use of management control systems at the school level. The first essay in the dissertation is a review and comparison of school economics research and management accounting research on schools, and an investigation of the communication between the two disciplines.

### ***Essay 1: The two worlds of school research?***

It has been mentioned that economics and management accounting are disciplines that are concerned with how organisations manage and utilise, or rather should manage and utilise, their available resources in the best possible way to achieve the organisation’s objectives. The goals of the first essay are to explore and compare management accounting research and school economics research on the school production process, school costs and the school cost function, school productivity and the effects of school reforms, and to study the communication structure between the two disciplines with regard to school research.

The essay finds that there are differences between school economics research and management accounting research with respect to the volume of studies, the issues studied and the methods applied. As opposed to what one might expect, there are only

two management accounting studies that apply a traditional or a more recent approach to cost management. In addition, although communication between two fields of research may have positive effects on knowledge in the field of common interest (Lukka & Granlund, 2002), an investigation of the communication structure between economics and management accounting research on schools reveals that there is almost no communication between the two disciplines with respect to school research.

## ***Essay 2: Output measures for performance evaluation of professional public services***

The second paper discusses output measurement, and consequently output control, of professional services like schools. Performance measures for management control should provide relevant, precise, complete and responsive information about the actions and efforts of individuals or organisations to achieve their organisation's objectives. However, the characteristics of professional public services in general, and the particular characteristics of schools and the school production process, give reasons to question whether school output measures could be useful for management control of schools. In essay two this issue is studied theoretically, with the Norwegian school quality control system and one Norwegian local school control system used to illustrate the discussion.

Essay two concludes that traditional school output measures such as final assessments, examination results and test results, as well as consumer-evaluated school output measures, including grading pupils' satisfaction with their learning environment, have limitations concerning the precise, complete and responsive requirements. Even if school output measures adjusted for pupils' family background and measures of pupils learning, i.e. "value added" school output measures (Ladd & Walsh, 2002), are more precise, complete and responsive, these types of measures would still have limitations with respect to these requirements. A discussion of whether activity measures, gauging what school services actually produce (Bradford, Malt, & Oates, 1969), might have a contribution to make concludes that a set of both school output and school activity measures may provide more precise, complete and

responsive information about schools' and school employees' actions and efforts to achieve school objectives.

### ***Essay 3: Deregulation and attitudes to change***

The third essay investigates how local school authorities have responded to the removal of the class size regulations by altering their school resource allocation formulae, and whether school resources are more equally distributed after the change in regulations. 49 municipalities were interviewed about changes in their local school resource allocation formulae and data for Norwegian primary and lower secondary schools was analysed to identify any changes in the distribution of school resources between schools.

Traditionally, there have been significant differences in resources per pupil between schools (Borge, Falch & Pettersen, 2002), and classes have been both a significant cost driver in Norwegian schools (Bjørnenak, 2000; Borge et al., 2002) and an important element in many municipalities' school resource allocation formulae. Essay three finds that almost all the municipalities interviewed have made, or plan to make, some changes to their school resource allocation formula; a significant number of municipalities have discarded the old class-size regulations as an element in their formula; and the municipalities with the most equal distribution of school resources initially have been the first to make changes to their resource allocation formulae. However, the changes have had no, or only a minor, effect on the actual allocation of resources. These findings suggest that changes are implemented where they are assumed to have no or limited effects, and that changes are actually designed for this result.

### ***Essay 4: Reforms and use of management control systems in schools***

Essay four is a descriptive/explorative case study investigating the design and use of management accounting and control systems in Norwegian public schools. The study focuses on whether and how school headmasters use management control systems in their internal control of schools, and how schools and headmasters have coped with



the recent school reforms. Anthony's management control process (e.g. Anthony & Young, 2003) and the concept of loose couplings (Brunsson, 1989) are used for the theoretical framework. Four school headmasters from the same municipality, from two primary schools and two lower secondary schools, were interviewed. In addition, one employee from the local school authorities was interviewed.

As opposed to Høgheim et al. (1989), who interpret discrepancies between budgeted and accounted expenditures as decoupling between talk (decisions) and action, essay four finds tight couplings between the budget and the accounts, but the tightly-coupled financial control system is only loosely coupled to action, the teaching activities. The study also finds loose couplings between elements in the management control process; for instance, that schools do not use reported school output measures for internal learning. In addition, even if pupils are organised in groups rather than classes in some schools after the removal of class-size regulations, teaching activities are still organised as before. Financial management on schools replacing line-item budgeting has caused no noticeable changes in the internal resource allocation of schools. Consequently, the study supports the impression that Norway is a hesitant reformer (Mellemvik & Pettersen, 1998).

### ***Conclusions and further theoretical propositions***

The overall objective of public organisations is to provide “the best possible services with the available resources” (e.g. Anthony & Young, 2003, p48) and, according to normative theory, management accounting and control systems are used to ensure that the available resources are used efficiently and effectively (e.g. Anthony, 1965).

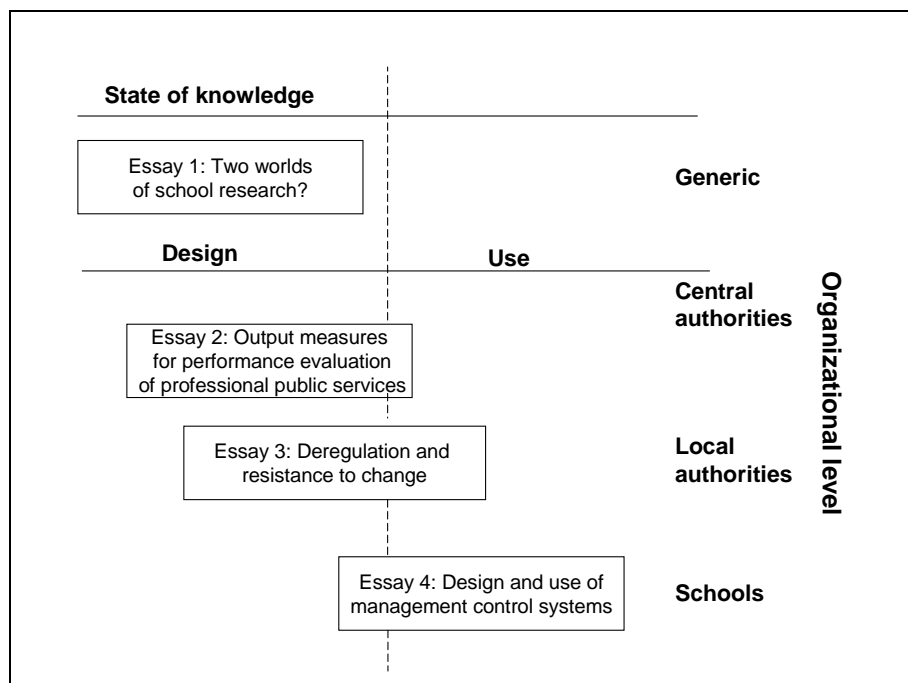
Essays two, three and four in this dissertation study the design and use of management control systems at the three organisational levels of Norwegian primary and lower secondary educations: the schools, the local school authorities and the central school authorities. In addition, the first essay reviews economics and management accounting research on schools and education and studies the communication structure between the two disciplines with regard to school research.

In the figure below, the essays are positioned using a design-use dimension and an organisational level dimension. Because of the nature of essay one, this study is

categorised as a “state of knowledge study”, rather than as a study along the design-use dimension. In addition, it does not focus on specific organisational levels, and is therefore placed outside the organisational level dimension.

The remaining three essays are spread along both the organisational level dimension and the design-use dimension. These studies focus on issues to do with the design and uses of management control systems in the individual school (essay four), by local school authorities (essay three) and by local and/or central school authorities (essay two). The discussion in essay two concerns whether different types of school output measures provide relevant, reliable, complete and responsive information about schools’ and school employees’ actions and efforts to achieve valued school objectives, and is thus mainly a study of how elements of school management control systems could be designed; essay three and particularly essay four are more focused on how management control systems are used.

**Figur 1: How the four essays relate to the design-use and the organizational level dimensions**



### **A consistent story of limited management accounting and control**

Although the four essays study management accounting and control systems in schools from different perspectives and use different methodological approaches, the findings and results from the essays tell a consistent story. The literature review in the first essay reveals that, compared to economics research on schools, management accounting researchers have paid limited attention to schools and education. In addition, this research on schools and school issues neither applies traditional and more recent methods to cost and performance measurement and management, nor does it study school management accounting and control systems and how such systems are used in education.

The three other essays illustrate a central school quality control system based on input measures as well as incomplete and imprecise output measures; a local school authority system using subjective and imprecise activity measures; while three of the four case schools in essay four do not use school output measures and none of them use school activity measures to control their schools' achievements with regard to pupils' performances, the number of lessons a pupil should get, or to ensure that the available resources are used efficiently and effectively. In addition, essay four in particular reveals loose or lacking couplings between different elements in the management control process.

Consequently, the four essays tell a consistent story of limited research on management accounting and control in schools, limited and simple management accounting and control systems in Norwegian schools and school authorities, and limited attention being paid to school activity control and efficiency evaluations.

### **Conventional wisdom vs. praxis**

Conventional wisdom assumes that management control systems are used to assure that resources are used "effectively and efficiently in the accomplishment of the organization's objectives" (Anthony, 1965, p17), and that there are couplings between elements of a management control system (e.g. Anthony and Young, 2003). In addition, these systems are used to communicate strategy and to motivate managers and employees to work towards the organisations' overall goals (e.g. Anthony & Govindarajan, 2001; Horngren, Datar & Foster, 2003; Kaplan & Norton, 1996), and

the measures used should satisfy certain requirements, such as the relevant, precise, reliable and responsive requirements discussed in essay 2. However, as is described above, essays two, three and four show that management accounting and control in Norwegian schools deviates from the textbooks' presentation of the systems and procedures for management control.

With regard to financial control, the picture is different. Essay four describes how headmasters focus on financial control, and essays four and two both mention that the headmasters have to send monthly accounting reports to their local school authorities. Consequently, the findings of the last three studies in this dissertation indicate that the practice is in accordance with conventional wisdom with regard to financial control in schools, while this does not apply to the use of management accounting and control systems for other types of performance control.

### **Decoupled school objectives**

The strong focus on financial control compared with that on the yearly report of school activities from the schools to local school authorities, and the lack of focus on school output measures or objective school activity measures in schools' and school authorities' performance control systems, suggests that there is at best a loose coupling, and possibly even a decoupling, between talk and action (Brunsson, 1989) with regard to overall school objectives throughout the organisational levels. The Norwegian Education Act (1998) states that pupils' learning and upbringing are valuable school objectives, and the focus on school output measures and measures of pupils' satisfaction with their learning environments in the national school quality control system is in line with these objectives. However, the monthly accounting reports from schools to their local school authorities, as well as the headmasters' strong focus on budget control, indicate that the most important school objective on both the school and local school authority levels is to avoid a budget deficit.

### **Effects of reforms**

The effects of reforms, in the shape of removed class-size regulations, have been studied in essay three, while the effects of both the removed class-size regulations and devolved financial management are focused on in essay four. Essay three finds that the local school authorities have altered their school resource allocation model, but

that the model is changed so that there are no effects on the actual allocation of school resources; while essay four finds that the four case schools still organise pupils and teaching activities in classes, even if the notion of a “class” in some schools has been replaced by “groups”. Essay four also shows that, even if the schools prepare their own budget as a consequence of devolved financial management, the actual allocation of school resources is hardly affected. Consequently, both studies support the impression that Norway is a hesitant reformer (Mellemvik & Pettersen, 1998). In addition, the proposition from essay three that changes are made in order to have no effects applies to both of these studies, whose findings propose that changes are made to have apparent effects and serve legitimating purposes, rather than to have any real impact. These two last propositions support studies of the implementation of formula funding and financial management in schools in three English local education authorities (e.g. Broadbent & Laughlin, 1998; Edwards, Ezzamel, Robson & Taylor, 1995; Edwards, Ezzamel, Robson & Taylor, 1996).

## **Policy implications**

For several years it has been known that Norwegian schools suffer from poor performances compared to the resources that are used on education, as well as in comparisons with other countries (e.g. OECD, 2004). In order to stimulate learning and school efficiency, Norwegian school authorities have implemented pedagogical and New Public Management inspired reforms. However, in December 2007 a new OECD report, along with the results from the reintroduced nationwide tests, showed that Norwegian pupils still perform lower than pupils in comparable countries (OECD, 2007), and that there are significant variations between municipalities and schools with regard to pupils’ achievements in Norwegian and English reading and in mathematics.<sup>2</sup>

In addition, newspapers have reported that pupils complain because they are not taught the lessons they should be and that lessons are used for other purposes than teaching and learning activities.<sup>3</sup> Even if the complaints about lessons not taught apply to upper secondary schools, it is reasonable to assume that whether and how

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<sup>2</sup> [http://www.udir.no/templates/udir/TM\\_Artikkel.aspx?id=3110](http://www.udir.no/templates/udir/TM_Artikkel.aspx?id=3110).

<sup>3</sup> e.g. Aftenposten, 07.01.24, 07.06.22, 07.11.21 and 07.11.22.

lessons are used for learning activities, and whether pupils get the number of lessons they should during a school year, might also be an issue in primary and lower secondary schools.

The present dissertation proposes that the recent New Public Management inspired reforms have neither had the intended effects with regard to changes in schools' and local school authorities' allocation of their available resources, nor created a stronger focus on school output and improved efficiency in schools and local school authorities. The discussion of school performance measures in essay two concludes that school activity measures might provide more precise and complete information with regard to the volume of schools' and school employees' actions and efforts to achieve valued school objectives, and that school output measures should be supplemented by school activity measures.

The recent public focus on whether pupils get the number of lessons they should according to the curriculum and regulations indicates that the time might have come to implement school activity measurement and a stronger focus on school activity control in Norwegian schools. The above discussion of how schools and their local school authorities focus more on financial control might serve as an example of how management control systems can be used to draw headmasters' attention to objectives that are regarded as valuable by their superiors, and to encourage headmasters to make decisions and arrangements to achieve these objectives. Therefore, the implementation of a school activity control system similar to the local control system used to control schools' financial resources used to ensure that the schools do not overdraw their budget limits, is proposed as a possible policy implication of the findings, results and theoretical propositions of the present dissertation.

## **Proposals for future research**

Proposals for future management accounting research are presented in the four essays. In addition, the above discussion of how the essays contribute to each other and supplement the findings from each individually highlights proposals for future

research on schools as well as offering additional ideas with regard to management accounting research on schools and education.

As already stated, this dissertation contributes to an understanding of what is referred to as the first transformation in the school production process, i.e. the use of school input resources for school activities or “services directly produced” (Bradford et al., 1969). In addition, the implementation of activity measurement has been proposed as a policy implication of the findings, results and theoretical propositions of this dissertation. In this, further research on school activity measurement and management are obvious proposals for future research with regard to this first school production transformation process. Other proposals for future management accounting research on schools are the application of a constructive approach (Kasanen, Lukka & Siitonen, 1993) to identify and measure school activities, for instance by use of ABC as a conceptual framework, as well as the use of school activity measures in local school control systems.

It has been mentioned that school economics studies find ambiguous results with respect to whether and how school resources and the characteristics of schools, school employees and peers affect school output (e.g. Hanushek, 2002). This ambiguity may be caused by limitations with respect to data or estimation techniques, but may also be due to limitations in the theoretical models (Hanushek, 2002, p.2083). According to Anthony, management control is “the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization’s objectives” (Anthony, 1965, p17), and findings from essay four illustrate how different control systems and regimes – the financial control system vs. other school performance control systems – might affect headmasters’ attention levels regarding different school objectives. Further research on how different types of school performance measures and school control systems or regimes affect school activities and decisions, and thus school output, are also proposals for management accounting research on schools. In turn, further management accounting based research on the design and use of management control systems in education might contribute to new or revised models of the school production process, which might in turn be estimated and tested on data from a larger sample of schools according to school economics traditions.

Teachers are a strong professional group in schools, and Norwegian teachers are normally members of the Union of Education Norway, a strong labour union. The role of teachers and school labour unions is not an issue that has been studied significantly by any of the studies reviewed in essay 1, nor is their role studied or discussed explicitly in any of the other essays, although teachers and the role of both teachers and their labour union is mentioned. Another proposal for research is thus to study the role of teachers and their labour organisation with regard to management control of schools, as well as concerning the implementation of school reforms or minor changes.



## Essay 1:

### The two worlds of school research?

*In order to achieve the best possible school services for the available resources, schools and school authorities may need knowledge and information about the school production process, school costs and school performances, and also about how reforms and management control systems can be used to achieve this overall objective. Both management accountants and economists study and discuss these questions in different ways, and communication between the two disciplines' researchers on the issue of schools may have positive effects on the overall knowledge with respect to school production. The first objective of this study is to describe and compare school economics (SE) research and management accounting (MA) research on school production, school costs, school productivity, school reforms and management control of school. The second objective is to study the communication structure between the disciplines. 15 MA articles and 90 SE articles have been reviewed. The study has revealed differences between the two groups of articles. SE research discusses or estimates the school production function, school costs, school productivity and the effects of reforms. The majority of these studies are analyses of archival data and they tend to consider schools or school districts as "black boxes". The MA studies focus to a greater extent on what is going on inside the "black boxes", and case/field studies are a frequently-used research approach. A large proportion of the MA studies investigate the effects of devolved financial management, while little attention is paid to cost and performance management, which are central issues in MA research and practice. Differences between the two disciplines with respect to the issues studied and methods applied might create positive effects from communication about knowledge of school production and school efficiency. However, an analysis of the communication structure indicates that there is almost no communication between the two disciplines with regard to school research.*

## **Introduction**

To achieve “the best possible services with the available resources” is normally the overall objective for public services, as well as for other non-profit organisations (e.g. Anthony & Young, 2003). To achieve this objective, managers and superior authorities need knowledge of the production processes and cost structures, as well as an awareness of how reforms, other incentives and management accounting and control systems could be used to communicate strategy, control performance and facilitate decisions to achieve the objective (e.g. Horngren et al., 2003).

Economics and management accounting research are different but related disciplines concerned with areas such as production processes, costs and performances and how to manage these issues. In addition, both disciplines are concerned with productivity, efficiency, reasons for inefficiency and how organisations and authorities use or could use reforms, other incentives and/or management control systems to affect organisational behaviour in order to maintain or increase efficiency. Even if economics may constitute a theoretical basis for management accounting research (Scapens & Bromwich, 2001; Shields, 1997), the two disciplines differ with respect to theoretical fundamentals and it is reasonable to assume that, in research on the same type of organisations and settings, they may focus on different research questions and follow different methodological traditions.

Communication between disciplines or circles of discussion is assumed to be “a positive driving force with regard to the development of knowledge with respect to the field” of common interest, and this idea of a positive driving force might apply to theoretical knowledge as well as to knowledge of practice in the field (Lukka & Granlund, 2002, p166). Use of agency theory, game theory and incomplete contracts in accounting research (e.g. J. Christensen, Wagenhofer, Gowthorne, Haller & Schlosser, 1994; P. O. Christensen & Feltham, 2004; Milgrom & Roberts, 1992), and journals like the *Journal of Accounting and Economics* are examples of communication between the two disciplines.

Health services and education are two examples of public services studied by both economics and management accounting researchers. Within economics research, health economics constitutes a separate discipline and there are specialised health economics journals like *Health Economics* and the *Journal of Health Economics*. Particular accounting or management accounting journals publishing health studies do not exist, but accounting/management accounting researchers have studied management accounting and control in health services such as hospitals (e.g. Abernethy & Brownell, 1999; Modell, 2001; Nyland & Pettersen, 2004; Pizzini, 2006). As with health services, school economics constitutes a separate discipline within the field of economics and there are separate school economics journals like *Education Economics* and *Economics of Education Review*. Although management accountants also study management accounting and control in education (e.g. Broadbent & Laughlin, 1998; Edwards et al., 1995; Modell, 2003a), again there are no separate accounting/management accounting journals publishing accounting/management accounting research on education.

Assuming that Lukka and Granlund's (2002) normative view with respect to the positive effects of effective working communication patterns also apply to communication between economics and management accounting research on public services, it is reasonable to assume that theoretical differences between the disciplines, as well as differences with respect to the types of research questions investigated and methodological approaches applied, are preconditions that should lead to these positive effects of communication. The objectives of the present study are to explore and compare management accounting research with school economics research on the school production process, school costs and the school cost function, school productivity and the effects of school reforms, and to study the communication structure between the two disciplines with regard to school research. More precisely, the study investigates and seeks to answer the following questions concerning the issues mentioned above:

- What issues are studied by the two disciplines?
- What methods and type of data are used in the studies?
- What is the communication structure between the two disciplines?

In this essay, research on schools and school issues published in accounting and management accounting research journals is referred to as MA studies or MA research, and research journals in this field are referred to as MA journals. Similarly, the studies published in school economics journals are referred to as SE studies or SE research, and the journals are referred to as SE journals. In addition, school economics research and management accounting research are referred to as two disciplines, while the studies reviewed from SE and MA research are referred to as two groups of studies or research.

There may be differences between countries with respect to children's age when they attend schools for the first time, and different countries may organise grade levels and school levels in different ways. The present study focuses on research on school levels approximately corresponding to primary and lower secondary education. Therefore, the terms "school" and "education" refer to these school levels. In addition, "school" refers to the particular school or school level, while "education" is used when several organisational levels, e.g. schools and local school authorities, are discussed or referred to.

The SE studies and MA studies focusing on schools or education-related issues are described and compared according to a set of dimensions that are discussed in the next section, while the research approach applied, including the choice of journals and method of study, is discussed in section three. In section four, the results of the study reviews are summed up and discussed according to the dimensions and categories from section two. The fifth section discusses the results from section four, while the sixth section concludes the study and discusses proposals for future management accounting research on schools.

## **Analysis dimensions**

The decision on how and by what dimensions research literature should be described and compared must be based on the purpose of the study (e.g. Bjørnenak & Mitchell, 2002; Scapens & Bromwich, 2001; Shields, 1997; Worthington, 2001). In this study, the MA and SE studies focusing on schools or education-related issues are described

and compared according to three dimensions. In addition, the communication structure between the two disciplines is studied.

SE and MA research may focus on the same or different research questions, and although there are different traditions with respect to the methods applied, the potential methodological approaches are the same for all research. The issues studied and the methods used in SE and MA research on schools is described and compared according to “the issue dimension” and “the research method dimension”. In addition, the description and comparison of methods used is extended by a focus on the similarities and differences between the two groups with respect to the data that is used in the empirical studies. Consequently, the reviewed studies are also described and compared according to “the data dimension”.

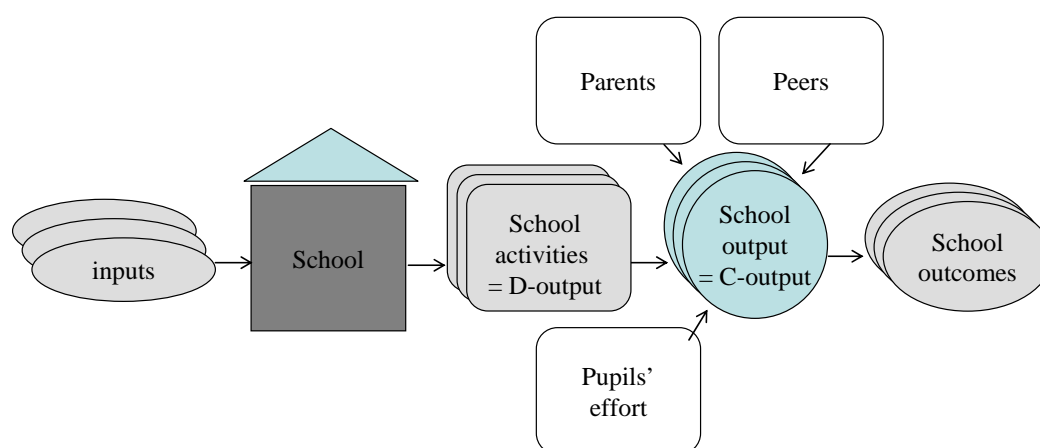
Theory or theoretical framework could be a fourth dimension. Even if economics might constitute a theoretical basis for MA research (Scapens & Bromwich, 2001; Shields, 1997), it is reasonable to assume that the studies reviewed are based on theories taken from the two disciplines respectively. For this reason, and because theory may be “implicit rather than explicitly discussed” (Scapens and Bromwich, 2001, p248), the theoretical basis for the studies reviewed is not described and compared.

### ***The issue dimension***

In SE research school output is assumed to be the result of school resources (input), the pupils’ own effort and abilities and the influences of families, friends and school mates (peers) (Hanushek, 2002, p2069). The figure below illustrates this school production model in an extended version. Inspired by Bradford, Malt and Oates (1969) and Duncombe, Miner and Ruggiero (1995), the transformation of school input to school output is decomposed into two processes: the transformation of school inputs to “school activities”, called D-output by Bradford et al. (1969); and the transformation of school services to school output, called C-output by the same researchers. The time used on different subjects is an example of school activities or school D-output (Bradford et al., 1969), while measures of pupils’ skill level such as test results, final assessments and examination results are examples of school C-

output. In addition, the figure illustrates education's effects on the society. These effects can be measured by economic growth, income in post-school professional occupation or other measures, and are referred to in the figure as school outcome.

**Figure 1: The school production process**



The school production process from school input to school output (C-output) is used as a framework for categorising the studies to be reviewed with respect to the issues studied and the studies are categorized into four predetermined issue categories.

The first of these is called the “generic knowledge about the school production process” category. This includes studies investigating the relationship between school input and school output; studies focusing on whether and how different factors such as school size, the allocation of time to class teaching, group teaching or individual instruction and/or other school activities or characteristics affect school output; and studies focusing on the relationship between school inputs and school activities. In addition, this category includes studies that focus on the school cost function – i.e. studies estimating or calculating school costs without any comparison to peer schools or standards – and studies discussing or investigating methodological issues related to school production or cost function estimation.

The second issue category contains articles focusing on best or relative productivity, defined as the relationship between inputs used and output or activities produced

when compared to peers' performances, prior performances and other productivity standards. Articles that focus on productivity and how to measure productivity, as well as studies estimating school efficiency frontiers or discussing methodological issues related to school efficiency or productivity estimation, are categorised as "productivity and performance measurement studies".

Unit cost may be interpreted as the inverse of the productivity measure. Therefore, studies of school averages or unit costs are also categorised as "productivity and performance measurement studies". Furthermore, studies examining or estimating the most efficient school size or school structure are placed in this category.

In recent decades, the use of different types of performance measures in addition to or instead of traditional performance measures such as output and productivity measures have increased, and the Balanced Scorecard (Kaplan & Norton, 1996) is one such recent approach to performance measurement and management. Articles focusing on performance measures other than pure productivity or efficiency measures, and having some comparison to standards, are also categorised as "productivity and performance measurement studies".

Local or central school authorities may introduce reforms and incentives to improve or maintain school efficiency, or to achieve other valued school objectives. Studies investigating the effects of implemented or potential reforms and incentives are categorised as "reform and effect studies" and sorted into subcategories according to the reforms, incentives or policy decisions studied.

Management control is defined as, "the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives" (Anthony, 1965, p17). Central and local school authorities may use management accounting and control systems to manage and control schools, while the schools may use management accounting and control systems for their internal activities and resource utilisation. Studies focusing on management accounting and control systems are categorised into the "design and use of management accounting and control systems" category.

In general, management accounting and management accounting research are concerned with issues such as cost accounting, the design and use of cost and performance measurement and management systems (e.g. Horngren et al., 2003; Scapens & Bromwich, 2001; Shields, 1997). This means that we should expect a focus on school costs, school performance measurement and both traditional and more recent systems for and approaches to cost and performance management in MA studies on schools and education. In general, economists are concerned with overall economic relationships, production functions, cost function and efficiency estimations, as well as with how reforms and incentives affect production, costs and efficiency. Consequently, it is reasonable to assume some differences between the two disciplines with respect to the issues studied.

### ***The research method dimension***

The method used to investigate an issue of interest depends on the type of research question that is being investigated (e.g. Ryan et al., 2002; Yin, 1994). Consequently, comparisons between two disciplines with respect to the methods applied may provide insights into the types of research questions that they look at, and reveal similarities and differences between the two disciplines with respect to the types of research questions being investigated.

Research methods can be categorised in different ways (e.g. Ryan et al., 2002; Scapens, 2006; Shields, 1997; Yin, 1994). The present study applies, with one exception, a synthesis of the methods most frequently used in the literature reviewed by Shield (1997) and Scapens and Bromwich (2001). The exception is the laboratory experiments that were used in about 14% of the studies reviewed by Shields. Consequently, the following categories are used in the present study: analytical discussion, analytic mathematical discussion, literature review, empirical studies using archival or survey data, case/field studies and method triangulation.

With respect to the methods applied in the studies, it is also reasonable to assume that there may be some differences between the two groups of research. Traditionally, school economics research is based on empirical analyses of large data samples (e.g. Hanushek, 2002); while it is reasonable to assume that MA research on schools and



school-related issues, as with MA research in general, applies a wider variety of methodological approaches (e.g. Scapens & Bromwich, 2001; Shields, 1997).

### ***The data dimension***

Although the method dimension categories indicate the type of data that is used in the empirical studies, a more thorough investigation of the data used may reveal interesting similarities or differences between the two disciplines. School systems, as well as the conditions under which schools operate, may differ between countries, and research results based on data from one country may not be valid for other countries. Therefore, the research method dimension is supplemented by an investigation of the type of data used in the empirical studies and another investigation of whether school data from some countries are more frequently used than data from other countries.

### ***The communication structure***

Communication between disciplines or circles of discussion is assumed to facilitate theoretical and practical knowledge with regard to a field of common interest (Lukka & Granlund, 2002). An investigation of the communication structure between MA and SE research on schools may indicate whether SE research draws on the research results from MA research on schools and vice versa, and whether the results and findings from the research undertaken by the two disciplines on schools have been accumulated into common knowledge.

MA research and economics research are related research traditions. Both are concerned with whether and how available resources are used efficiently and effectively to achieve the objectives of an individual or an organisation, and with how incentives are used or might be used to encourage individuals and organisations to achieve the objectives that are valued by their superiors. In addition, the field of economics might constitute a theoretical basis for MA research (Scapens & Bromwich, 2001; Shields, 1997), and there has been research at the point of intersection between economics and accounting, for instance in research on agency theory, signalling, incomplete contracts and game theory (J. Christensen et al., 1994). There are also journals, like the *Journal of Accounting and Economics*, which publish

research at this point of intersection between the two disciplines. These facts give reason to expect communication between school economics research and management accounting research on schools, as well as asking the question whether MA and SE research on school issues constitute one common research tradition or discipline rather than two or more.

## **The research approach**

Research journals are important publishing channels for novel research. For this reason, the present study reviews articles that are published in research journals. This section discusses which journals are searched and how the journals are searched to identify articles that study or discuss issues of interest for this study.

### ***The search approach***

#### **Journals searched**

MA research on school issues may be published in management accounting research journals and in general accounting journals. The two management accounting research journals, Management Accounting Research and the Journal of Management Accounting research, are included in the group of journals searched in the present study. Because it is reasonable to expect that the number of MA articles focusing on school-related issues is limited (Scapens & Bromwich, 2001; Shields, 1997), ten general accounting research journals are also searched for articles focusing on schools or school-related issues. Eight of these journals are considered to be key journals for accounting and MA research by other researchers (Bjørnenak & Mitchell, 2002; Shields, 1997). These eight are: Accounting, Organizations and Society, The Accounting Review, Contemporary Accounting Research, the Journal of Accounting & Economics, the Journal of Accounting Research, Accounting Horizons, Critical Perspectives on Accounting and the Journal of Accounting Literature. In addition, the Accounting, Auditing and Accountability Journal and The European Accounting Review are included. The European Accounting Review is included in the searches because of its particular focus on European research and because, as the international scholarly journal of the European Accounting Association, it has a widespread

audience. The Accounting, Auditing and Accountability Journal is included due to a focus on research “concerning the interaction between accounting/ auditing and their socio-economic and political environments”,<sup>1</sup> a focus which may be interesting with regard to research on schools and education.

Schools are normally public or publicly subsidised, and journals publishing research on public service-related issues may also publish economics or management accounting research on schools. One journal publishing public sector-related MA research is included in the sample of journals searched: Financial Accountability and Management.

SE research may be published in general economics research journals, in school economics research journals, in economics journals focusing on public sector-related issues or in economics journals focusing particular theoretical or methodological issues. Although one may assume that school economics studies at the research front may be published in general economics journals rather than in the more specific school economics journals, studies that focus on new issues or methods will most likely be published in the school economics journals shortly after the first articles on a new issue or method are published in the general economics journals. Therefore, and because school economics is a well-established research discipline with a large number of studies on issues of interest for the present study, only the two school economics research journals, Education Economics and Economics of Education Review, are searched. In addition, both SE and MA research on school issues may be published in journals focusing on education research, but this type of journals is not searched.

### **Time span**

The emergence of the New Public Management (NPM) in the late 1970s and the 1980s has inspired a range of public sector reforms based on private sector management ideas (Gruening, 2001; Hood, 1995) and it is reasonable to assume that the NPM have also inspired research on the effects of such reforms, as well as research providing generic knowledge about organisations or processes exposed to NPM reforms. Therefore, the emergence of the NPM is a natural starting point for the

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<sup>1</sup> <http://www.emeraldinsight.com/info/journals/aaaj/aaaj.jsp>.

searches. In addition, the volume of research journals and research has increased significantly in recent decades and only a few of the journals searched in this study existed before 1980. For these reasons, the present study's searches for articles have been restricted to research published from 1980 until 2006.

### **Search procedures and selection criteria**

Although the present study seeks to describe and compare research from two disciplines on a common subject, the two disciplines might apply different theoretical and methodological approaches. Therefore, the literature searched probably does not constitute one well-defined area of research. In addition, taking into account that the literature of interest is initially not well known by the researcher, approaches such as "Papineau's tree" and "the network theory of models" (Ryan et al., 2002, p191ff) may be difficult to apply. For these reasons, a simpler method has been used. With one exception, the journals are searched electronically with relatively broad keywords, and the abstracts have been read through to establish whether the articles are within the area of interest.

Because the literature searches are made in journals that publish research from different disciplines, and because some preliminary searches indicated that there are few articles in the MA journals focusing on school-related issues, different keywords are used to search the two types of journals. The SE journals are searched by the keywords "productivity", "cost", "efficiency", "budget" and "management accounting". Other journals are searched by the keywords "school" and "education".

Most of the searches were carried out using the EBSCO database, but some journals have been searched using the Science Direct and Emerald databases. Issues, abstracts and keywords were examined, and the search keywords were truncated. One journal, the *Journal of Accounting Literature*, was only available in a printed version in the Norwegian library system when the searches were carried out. For this journal, titles and the articles' introduction sections have been read through. Table 1 shows the database and keywords used, as well as the fields searched, for each journal.

**Table 1: Journals searched**

Journal	1. volume	Database	Keywords	Fields searched
<b>School economics (SE) journals</b>				
Economics of Education Review (USA?)	1981	EBSCO	Productivity, cost, efficiency, management accounting, budget	T, A, K
Education Economics (UK?).	1993	EBSCO	Productivity, cost, efficiency, management accounting, budget	T, A, K
<b>Management accounting/accounting (MA) journals</b>				
Management Accounting Research	1990	Science direct	School, education	At least T, A, K
Journal of Management Accounting Research	1989	EBSCO,	School, education	T, A, K
Accounting Horizons	1987	EBSCO	School, education	T, A, K
Accounting, auditing and accountability journal	1988	Emerald	School, education	All fields except full text
Accounting, Organizations and Society	1976	Science direct	School, education	At least T, A, K
Contemporary accounting research	1984	EBSCO	School, education	T, A, K
Critical Perspectives on Accounting	1990	EBSCO	School, education	T, A, K
European Accounting Review	1992	EBSCO	School, education	T, A, K
Journal of Accounting and Economics	1976	Science direct	School, education	At least T, A, K
Journal of Accounting Literature	1982	Printed version	Titles and introductions are read through	T, A
Journal of Accounting Research,	1966	EBSCO	School, education	T, A, K
The Accounting Review,	1926	EBSCO	School, education	T, A, K
Financial accountability and Management	1985	EBSCO	School, education	T, A, K

T=title, A = Abstract, K = Keywords

The journals are searched for articles focusing on school levels approximately corresponding to primary and lower secondary schools. However, different countries organise their schools in different ways and thus some studies that focus on other school or grade levels may have been included. Research focusing on higher (tertiary) or pre-school education is not included.

The searches identified articles using both school output and school outcome as results of the school production process (cf. figure 1). However, articles focusing on school outcome (e.g. Lewis, Bruininks, Thurlow & McGrew, 1989; Mak, 2000; Meng, 1995) are not included in the present study. Other studies only border on issues of interest in the present study. Such studies include Falch and Rattso's (1996)

study of factors that have influenced the growth in per pupil expenditure in Norwegian schools after World War II and Neu, Gomez, Graham and Heincke's (2006) study of how lending agreements between the World Bank and developing countries "install a variety of informing technologies across a network of agents in Latin America" (Neu et al., 2006, p635) when developing countries borrow money in the World Bank for basic education purposes. These studies are not concerned with individual schools, how individual schools are controlled by their superior authorities nor do the studies use school level data. Therefore, even if such studies may provide knowledge that could be useful for superior authorities' control of schools, these and similar studies are not included in the present study.

Several of the studies identified by the searches focus on issues of general interest, but the empirical data used is school data. Whether such studies are included in the present literature review depends on the issue being studied. Examples of this kinds of studies are Roberts, Glezen and Jones's (1990) study of the reasons why organisations replace their auditor with a new one, Mayston's (1998) study of the effects of different resource allocation systems or procedures on equal opportunities for disadvantaged pupils and Bjornenak's (2000) study of whether the cost driver concept applies to public services. Of the three examples above, Roberts, Glezen and Jones's (1990) article does not focus on an issue directly related to school production, management accounting and control in schools or the other issues of interest for this study. Therefore, their work is excluded from the present study; the other two are included.

Finally, some articles focusing on demand side issues were identified by the keywords "school" and "cost". Examples of these studies are articles studying the demand for schooling in societies where school attendance is not compulsory (Alderman, Kim & Orazem, 2003; Hazarika, 2001); articles investigating whether vouchers have particular effects on demand side issues, such as who takes up the option to choose a school and what schools they choose (Manski, 1992); and an investigation of voters opinions about and preferences for private schools (Belfield, 2003). Articles focusing solely on demand side issues are not included in the present literature study, while those that focus demand side issues combined with issues of interest for the present study are examined (e.g. Hoenack, 1997).

### ***Indicators of communication across disciplines***

It has been mentioned above that communication between disciplines or discussion circles might have positive effects on theoretical knowledge with respect to the field of common interest, and also to practical knowledge (Lukka & Granlund, 2002). References in research across the disciplines or traditions, researchers' participation in cross-disciplinary conferences, in research forums or discussion circles and participation in cross-disciplinary research could be interpreted as communication between disciplines or research traditions. In addition, journals, conferences and research forums publishing or discussing research at the point of intersection between disciplines could be interpreted as materialisations of such communication.

Consequently, the participation of researchers in networks from other disciplines, co-authorship with researchers from other disciplines and cross-disciplinary references might be possible indicators of communication between disciplines. In this paper, cross-disciplinary references, i.e. whether school economics studies refer to MA literature or MA school studies refer to economics literature, are used as one of two indicators for communication between SE and MA research on schools or school issues. The other indicator is whether and how many of the studies reviewed from the two disciplines have the same author or authors, i.e. whether the same authors are represented by studies in both types of journals in the sample of articles reviewed.

Few articles with cross-disciplinary references and few authors represented with studies in both types of journals would indicate little communication and consequently little learning across the disciplines; while a large proportion of articles with cross-disciplinary references and many authors represented in both types of journals might indicate that the studies reviewed represent one common discipline or field of research, rather than two or more disciplines.

## The literature analysis results

The searches and the subsequent review of the abstracts identified 105 articles that focus on issues of interest for the present study.<sup>2</sup> As expected, in light of previous reviews of MA research (Scapens & Bromwich, 2001; Shields, 1997) the table below shows that MA researchers have paid limited attention to school issues compared to the economists' interest in school research.

**Table 2: The number of articles by journal**

Journal	Count	Percent
<b>School Economics (SE) journals</b>		
Economics of Education Review	66	62.9 %
Education Economics	24	22.9 %
<b>Accounting/Management accounting (MA) journals</b>		
Management Accounting Research	3	2.9 %
Journal of Management Accounting Research	0	0.0 %
Journal of Accounting and Economics	1	1.0 %
The Accounting Review	0	0.0 %
European Accounting Review	0	0.0 %
Journal of Accounting Research,	0	0.0 %
Accounting, Organizations and Society	1	1.0 %
Contemporary Accounting Research	0	0.0 %
Accounting Horizons	0	0.0 %
Critical Perspectives on Accounting	1	1.0 %
Journal of Accounting Literature,	0	0.0 %
Accounting, Auditing and Accountability journal	4	3.8 %
Financial Accountability and Management	5	4.8 %
<b>SUM</b>	105	100.0 %

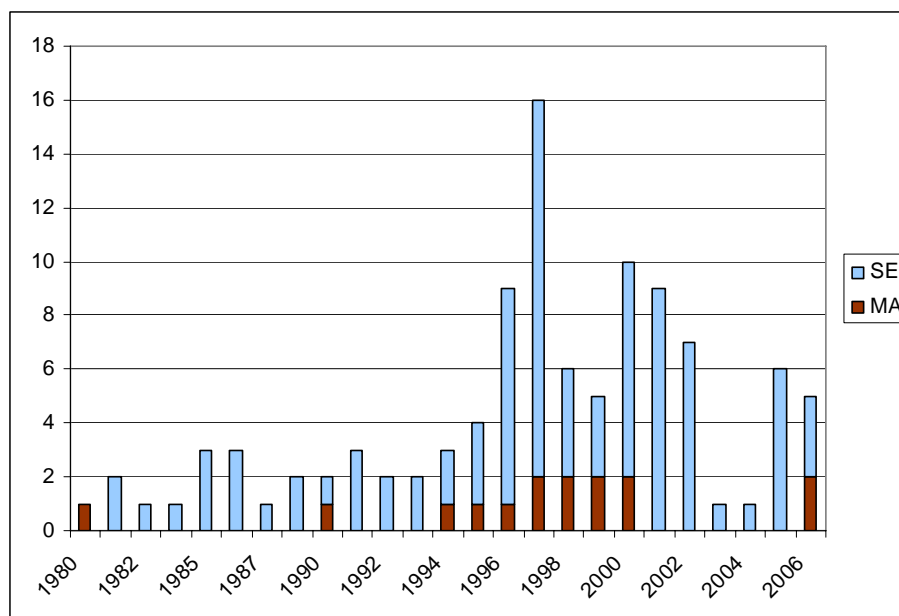
During the 27 years covered, the number of articles studying issues of interest has increased, even if this has not been the case in some of the most recent years (cf. figure 2). The increase in the amount of research being undertaken and an increased number of research journals over the period searched are two obvious reasons for the higher number of articles in the 1990s. The first issue of Educational Economics appeared in 1993, the management accounting research journals appeared in 1989 and 1990 and six other accounting journals were released between 1984 and 1992. In addition, the variation in the number of articles identified for the different years might reflect a variation in journals' editorial policies or variation with respect to research on issues of interest for the present study over the course of time.

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<sup>2</sup> A table containing the classification of the articles and a short description of the articles' objectives is enclosed in appendix 1.



**Figure 2: Number of articles by type of journal and time**



### ***Issues studied***

A comparison of the 90 SE and 15 MA studies reveals significant differences between the two groups of journals with respect to the issues studied. The table below shows that, while almost one-third of the SE studies are generic studies of the school production process, only one of the 15 MA studies can be classified into this category. On the other hand, a comparatively larger proportion of the MA studies are reform and effect studies or studies focusing on design and use of management accounting and control systems. Further, the comparison of the two groups of studies reveals that the proportion of productivity studies are about the same size for both groups, and that eight SE studies were difficult to categorise into any one of the four issue categories, even if the studies were identified by the search keywords and therefore included in the present study. These eight studies are categorised as “other” studies.

The productivity studies category was initially entitled “productivity and performance measurement studies”. However, no articles were found focusing on and comparing types of performance measures other than productivity and efficiency measures or estimates. Therefore, in the following this category is referred to as “productivity studies”.

The number of MA articles is small and the differences between the two groups may change considerably if one or two of the articles could have been categorised differently. In addition, the limited number of MA articles creates several cells with a count of less than five and thus an unreliable Chi-square measure (Bryman & Cramer, 1994, p164). However, even considering these facts, it seems reasonable to assume that the differences between SE research and MA research on schools are not merely a result of coincidence.

**Table 3: Issues studied**

	SE journals <sup>1</sup>		MA journals <sup>2</sup>		Total		
	Count	Percent	Count	Percent	Count	Percent	
Generic knowledge about the school production process	29	32.2 %	1	6.7 %	30	28.6 %	
Productivity studies	22	24.4 %	3	20.0 %	25	23.8 %	
Reform and effect studies	30	33.3 %	8	53.3 %	38	36.2 %	
Design and use of management accounting and control systems	1	1.1 %	3	20.0 %	4	3.8 %	
Other studies	8	8.9 %	0	0.0 %	8	7.6 %	
<b>Total</b>	<b>90</b>	<b>100.0 %</b>	<b>15</b>	<b>100.0 %</b>	<b>105</b>	<b>100.0 %</b>	
<b>Pearson chi-square test</b>							
Value	17.842(a)						
df	4						
Asymp. Sig. (2-sided)	0.001						

(a) 5 cells (50.0%) have an expected count less than 5. The minimum expected count is 0.57.

When the SE and MA reform and effect studies are categorised according to the reforms studied or discussed, several differences between the two groups of studies are revealed. The table below shows that more than 50% of the SE reform and effect studies discuss or investigate effects of free school choice, while none of the MA articles focus on this issue. On the other hand, seven of eight MA reform and effect studies investigate or discuss effects of devolved financial management, while the effects of this type of reform are the theme of only 10% of the SE reform and effect studies.

**Table 4: Reform and effect studies categorised by the reform studied**

	SE journals		MA journals		Total	
	Count	Percent	Number	Percent	Number	Percent
Free school choice	17	56.7 %	0	0.0 %	17	45.9 %
Devolved financial management and formula funding	3	10.0 %	7	87.5 %	10	27.0 %
Financing	4	13.3 %	1	12.5 %	5	10.8 %
Other reform and effect studies	6	20.0 %	0	0.0 %	6	16.2 %
<b>Total</b>	<b>30</b>	<b>100.0 %</b>	<b>8</b>	<b>100.0 %</b>	<b>38</b>	<b>100.0 %</b>
<b>Pearson chi-square test</b>						
Value	20.552(a)					
df	3					
Asymp. Sig. (2-sided)	0.000					

(a) 6 cells (75.0%) have expected count less than 5. The minimum expected count is 1.05.

As expected, a large proportion of the SE studies are concerned with the school production process, school productivity and efficiency, and whether and how different reforms might affect or have affected school productivity. In addition, several of the studies in both the “generic knowledge about the school production process” and the “productivity studies” categories discuss methodological issues concerning estimation of the school production function and school efficiency. Independent of the specific issues studied, most of the SE studies deal with the relationship between school input and school output and how school services or school service characteristics, such as the number of pupils in each class, school size, teacher characteristics or other school characteristics, affect school output (e.g. Barnett, Glass, Snowdon & Stringer, 2002; Brown & Saks, 1987; Correa, 1993; Stern, 1989). Only a few articles focus on school activities, “the services directly produced” (Bradford et al., 1969, p186), or on the relationship between school activities and school inputs or costs (Levin & Woo, 1981; Millot & Lane, 2002; Pritchett & Filmer, 1999).

Further investigation of the MA studies reveals that MA research, with one exception, has almost not used accounting-based approaches to studies of school costs, school production and school productivity. The exception is the one MA study categorised as a “generic knowledge about the school production process” study. This article studies whether the cost driver concept applies to a public sector setting (Bjørnenak, 2000). The three MA productivity studies are based on economics approaches to efficiency estimation (Chalos, 1997; Charnes & Cooper, 1980; Dopuch & Gupta, 1994).

The reform and effect studies category reveals further differences between SE research and MA research. While the SE reform and effect studies generally study how school output and/or school productivity are affected by reforms (e.g. Goldhaber, 1996; Levin, 1991; Rangazas, 1997; Winkler & Rounds, 1996), the MA studies pay almost no attention to these issues. Most of the MA reforms and effect studies are concerned with how the reform has affected the organisations and how the organisations cope with the reform (Broadbent & Laughlin, 1998; Edwards et al., 2000; Edwards, Ezzamel & Robson, 2005; Edwards et al., 1995; Edwards et al., 1996; Laughlin et al., 1994).

Figure 2 above illustrates how the number of articles focusing on issues of interest for the present study has increased from 1980 to 2006. The table below shows that there has been little variation with respect to the issues studied over these years. The most significant change is the appearance of SE studies focusing on free school choice and MA studies of financial management at schools in the 1990s.

**Table 5: Number of articles by issue, time and type of journal**

	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2006	Total
<b>SE studies</b>							
Generic studies	2	3	3	11	7	3	29
Productivity	1	3	2	7	7	2	22
Reform and effect studies:							
<i>Free school choice</i>	0	0	1	11	3	2	17
<i>Devolved financial management and formula funding</i>	0	2	0	0	1	0	3
<i>Financing</i>	1	0	1	0	2		4
<i>Other reform and effect studies</i>	0	1	0	0	4	1	6
Management accounting and control systems	0	0	0	1	0	0	1
Other	0	0	3	2	2	1	8
<b>Total SE studies</b>	<b>4</b>	<b>9</b>	<b>10</b>	<b>32</b>	<b>26</b>	<b>9</b>	<b>90</b>
<b>MA studies</b>							
Generic studies	0	0	0	0	1	0	1
Productivity	0	0	1	2	0	0	3
Reform and effect studies:							
<i>Devolved financial management and formula funding</i>	0	0	1	4	1	1	7
<i>Financing</i>	0	0	0	0	0	1	1
Management accounting and control systems	1	0	0	2	0	0	3
<b>Total MA studies</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>8</b>	<b>2</b>	<b>2</b>	<b>15</b>
<b>Total</b>	<b>5</b>	<b>9</b>	<b>12</b>	<b>40</b>	<b>28</b>	<b>11</b>	<b>105</b>

## **Methods applied**

A comparison of the methods used also reveals differences between the two groups of studies (cf. table 6). The majority of the studies reviewed are categorised as empirical studies using archival or survey data, and compared to what is the case for the MA studies a large proportion of the SE studies are empirical studies using archival or survey data. The number of case/field studies is limited, but this research approach is used in 40% of the MA studies yet in only one of the 90 SE studies. About 22% of all studies are analytical, and the proportion of this type of study, as well as the proportion of studies using more than one research approach, is at about the same level in the two groups. The remaining five studies are SE literature reviews.

**Table 6: Method approaches**

	SE journals		MA journals		Total		
	Count	Percent	Count	Percent	Count	Percent	
Empirical studies using archival or survey data	61	67.8 %	4	26.7 %	65	61.9 %	
Analytical discussion/other	12	13.3 %	4	26.7 %	16	15.2 %	
Analytic mathematical	7	7.8 %	0	0.0 %	7	6.7 %	
Case/field studies	1	1.1 %	6	40.0 %	7	6.7 %	
Literature review	5	5.6 %	0	0.0 %	5	4.8 %	
Method triangulation	4	4.4 %	1	6.7 %	5	4.8 %	
<b>Total</b>	<b>90</b>	<b>100 %</b>	<b>15</b>	<b>100 %</b>	<b>105</b>	<b>100 %</b>	
<b>Pearson chi-square test</b>							
Value	36.310(a)						
df	5						
Asymp. Sig. (2-sided)	.000						

(a) 7 cells (75.0%) have expected count less than 5. The minimum expected count is 0.71.

Due to the limited number of MA studies, it is difficult to draw conclusions with respect to the extent of differences and similarities between the two disciplines in terms of the methods used in studies of different types of issues (cf. table 7). Only the methods applied in MA and SE reform and effects studies call for some attention. The SE reform and effect studies are mainly empirical studies of archival or survey data or analytical studies, while the MA studies are for the most part case/field studies.

**Table 7: Issues studied vs. method used by type of journal**

	Empirical analyses of archival/survey data	Analytical/other	Case/field studies	Literature-review	Method triangulation	Total
<b>SE journals</b>						
Generic knowledge	25	2	0	1	1	29
Productivity studies	14	3	0	3	2	22
Reform and effect studies	16	11	1	1	1	30
Management accounting and control	1	0	0	0	0	1
Other studies	5	3	0	0	0	8
<b>Total SE studies</b>	<b>61</b>	<b>19</b>	<b>1</b>	<b>5</b>	<b>4</b>	<b>90</b>
<b>MA-journals</b>						
Generic knowledge	0	0	0	0	1	1
Productivity studies	3	0	0	0	0	3
Reform and effect studies	1	1	6	0	0	8
Management accounting and control	0	3	0	0	0	3
<b>Total MA studies</b>	<b>4</b>	<b>4</b>	<b>6</b>	<b>0</b>	<b>1</b>	<b>15</b>
<b>Total MA + SE studies</b>	<b>65</b>	<b>23</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>105</b>

The differences in the research methods used between the two disciplines are in line with what would be expected based on the competitive advantages of management accountants and MA research when compared with economists and economics research (Kaplan, 2006, p130). Even if some of the differences with respect to the methods used in the studies published in the MA and SE journals may be attributed to the fact that eight of the 15 studies published in the MA journals are by members of the same group of researchers, it is reasonable to assume that the differences in terms of archival data analyses vs. case/field studies is the result of different traditions between the two disciplines.

Empirical analysis of archival or survey data has been the dominant research approach in studies published in all periods, except for that between 1990 and 1994 (cf. table 8). In that period, the number of analytical articles was larger than the number of “empirical analysis of archival or survey data” studies. Even if there has been some variation in the methods used, it is difficult to conclude that the methods applied have changed significantly over time.

**Table 8: Research method by time period in numbers and % of the period total**

	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2006	Total
<b>Number of studies</b>							
Empirical analysis of archival or survey data	5	5	5	23	19	8	65
Analytical	0	2	6	10	3	2	23
Case/field studies	0	1	1	3	1	1	7
Literature review	0	0	0	2	3	0	5
Method triangulation	0	1	0	2	2	0	5
<b>Total</b>	<b>5</b>	<b>9</b>	<b>12</b>	<b>40</b>	<b>28</b>	<b>11</b>	<b>105</b>
<b>Column percent:</b>							
Empirical analysis of archival or survey data	100.0 %	55.6 %	41.7 %	57.5 %	67.9 %	72.7 %	61.9 %
Analytical/other	0.0 %	22.2 %	50.0 %	25.0 %	10.7 %	18.2 %	21.9 %
Case/field studies	0.0 %	11.1 %	8.3 %	7.5 %	3.6 %	9.1 %	6.7 %
Literature review	0.0 %	0.0 %	0.0 %	5.0 %	10.7 %	0.0 %	4.8 %
Method triangulation	0.0 %	11.1 %	0.0 %	5.0 %	7.1 %	0.0 %	4.8 %
<b>Total</b>	<b>100.0 %</b>	<b>100.0 %</b>	<b>100.0 %</b>	<b>100.0 %</b>	<b>100.0 %</b>	<b>100.0 %</b>	<b>100.0 %</b>

### **Data used**

A more thorough investigation of the data used in the 77 studies categorised as empirical analysis of archival or survey data, case/field studies and method triangulation reveals that these studies use different types of data from different countries. In addition, there are variations between the two groups of studies with respect to the type of data used. Archival or survey data is used in 85.8% of the SE studies, while this is the case in only three of the 14 articles from MA journals. Of the 59 articles that are categorised as empirical studies using archival or survey data, only three use data specifically collected for the actual study. Consequently, 56 of these studies use data samples collected for other purposes, for instance data collected by central authorities, data collected by other authorities or organisations or data used in previous studies. In addition, three studies analyse both archival and survey data and are categorised under “data triangulation”. The majority of the 11 articles from the MA journals are based on interviews or more than one source of data, such as interviews in combination with surveys or observations supplemented by documents. The three studies categorised as “other” in the table below use estimates from previous studies or data from other sources.

**Table 9: Empirical studies sorted by type of data and journals**

	SE journals		MA journals		Total		
	Count	Percent	Count	Percent	Count	Percent	
Only archival or survey data	56	84.8 %	3	27.3 %	59	76.6 %	
Interviews	1	1.5 %	3	27.3 %	4	5.2 %	
Data triangulation	6	9.1 %	5	45.5 %	11	14.3 %	
Other	3	4.5 %	0	0.0 %	3	3.9 %	
<b>Total</b>	<b>66</b>	<b>100.0 %</b>	<b>11</b>	<b>100.0 %</b>	<b>77</b>	<b>100.0 %</b>	
<b>Pearson chi-square test</b>							
Value	25.348(a)						
df	3						
Asymp. Sig. (2-sided)	0.000						

(a) 5 cells (62.5%) have expected count less than 5. The minimum expected count is 0.43.

Data from more than 20 countries are used in the 77 empirical studies and there are differences between SE and MA articles with respect to the geographical origin of the data. USA data is used in about 65% of the empirical SE articles and in about 27% of the 14 MA articles. On the other hand, about 6% of the SE articles and 64% of the MA studies use data from the UK.

**Table 10: Countries represented with empirical data in the studies**

	SE journals		MA journals		Total	
	Count	Percent	Number	Percent	Number	Percent
USA	43	65.2 %	3	27.3 %	46	59.7 %
Canada	1	1.5 %	0	0.0 %	1	1.3 %
UK	4	6.1 %	7	63.6 %	11	14.3 %
Other European countries	4	6.1 %	1	9.1 %	5	6.5 %
Other South-America	3	4.5 %	0	0.0 %	3	3.9 %
Australia	1	1.5 %	0	0.0 %	1	1.3 %
Eastern countries	5	7.6 %	0	0.0 %	5	6.5 %
African countries	1	1.5 %	0	0.0 %	1	1.3 %
Middle Eastern countries	1	1.5 %	0	0.0 %	1	1.3 %
Unknown and other countries	3	4.5 %	0	0.0 %	3	3.9 %
<b>Total</b>	<b>66</b>	<b>100.0 %</b>	<b>11</b>	<b>100.0 %</b>	<b>77</b>	<b>100.0 %</b>

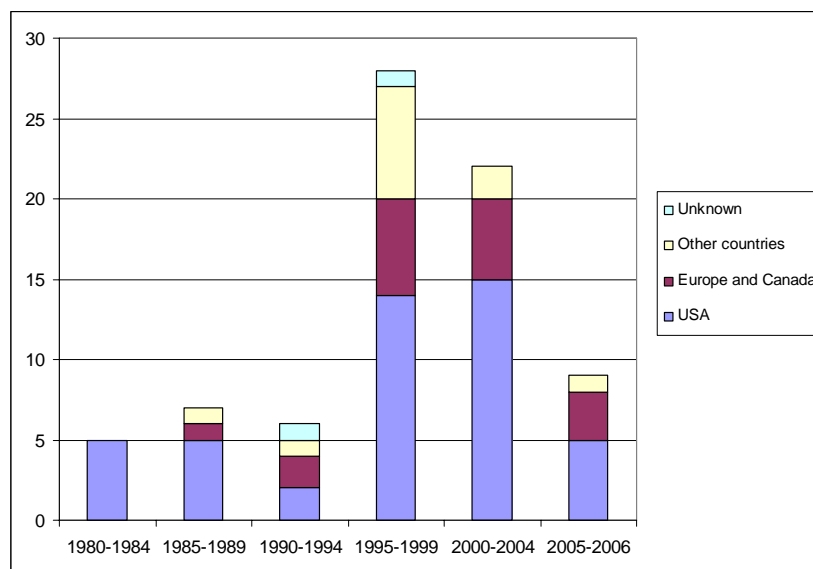
The fact that 70.9% of the empirical studies published in the Economics of Education Review use USA data while only 35.7% of the 14 empirical studies from Education Economics use data from the USA, combined with the fact that six of the MA studies use data from the same UK schools and Local School Authorities (LEAs) and are written by members of the same group of researchers (Broadbent & Laughlin, 1998; Edwards et al., 2000; Edwards et al., 2005; Edwards et al., 1995; Edwards et al., 1996; Laughlin et al., 1994), indicates that the differences with respect to the origin of data may be caused by coincidence or by geographical, editorial and/or other differences, rather than by differences between the two disciplines. With respect to the types of



data used, i.e. the use of archival data vs. interviews and more than one source of data, it is more reasonable to assume that the variations reflect different approaches by the two disciplines.

The large number of SE studies using USA data raises the question whether the results from these studies apply to schools and education in other countries. In the same way, the results from case/field studies in a group of UK schools and Local Education Authorities might not apply to other schools or Local Education Authorities exposed to the same type of reform. To understand whether and how national conditions and traditions affect school production, school productivity, how schools and school employees respond to reforms and how schools are or should be managed and controlled, it may be necessary to use data from a larger sample of countries or geographical areas in both SE and MA school studies. The figure below shows that the number and proportion of studies based on data from countries other than the USA has increased in the course of time, but also that the relative proportion of studies using data from other countries has decreased in the most recent periods.

**Figure 3: Countries represented in the empirical studies**



## **The communication structure**

The comparisons of the SE and MA articles have revealed differences with respect to the issues studied and methods applied, differences which may facilitate mutual learning and the accumulation of knowledge with regard to school production and management accounting and control in schools and education. However, to achieve these positive effects there should be communication between the two disciplines (Lukka & Granlund, 2002).

The results from the communication structure analysis reported in table 11 below show that only one of the 90 SE articles refers to MA literature, though not necessarily to articles included in the present study, while 82 of the SE articles have references to general economics literature. Four articles (about 27%) from the MA journals refer to economics literature, while 14 of the 15 MA articles have references to accounting or management accounting literature. In addition, the 105 articles reviewed are written by a total of 147 authors. Of these, 20 authors are represented by more than one article in the sample, while only two of these authors are represented in both types of journals (Levacic, 1990; Levacic & Vignoles, 2002; Mayston, 1996, 1998).

**Table 11: Authors in and references between articles from the two types of research journals**

	<b>SE journals</b>	<b>MA journals</b>	<b>Total</b>
Total number of studies	90	15	105
Average number of references	29,7	46,1	32,1
Number of SE articles with reference(s) to articles published in MA journals	1		
Number of MA articles with reference(s) to articles published in SE journals		4	
Number of SE articles with reference(s) to SE or other economics journals	82		
Number of MA articles with reference(s) to articles published in other accounting or management accounting journals		14	
Number of authors	129	20	147
Authors represented in both MA and SE journals (in the sample of 105 articles)			2

This almost complete lack of references to accounting and/or management accounting literature in the SE studies, and the limited amount of MA studies including references to economics literature, combined with the fact that only two authors are

represented in both groups of journals, indicate that there is little communication between SE and MA research on the issues of interest for the present study. It may be reasonable to conclude that the MA and SE studies reviewed are studies from at least two different disciplines, rather than from one common field of school research. In addition, the communication structure analysis proposes that, regarding SE and MA research on schools, the potential positive effects of communication are not being achieved.

## **Discussion**

### ***SE and MA school research - similarities and differences***

Although the number of MA articles reviewed is small, the comparisons of the two groups of articles have revealed significant similarities and differences with respect to the issues studied and the methods and types of data used in the studies. In general, articles from the SE journals focus on estimation of the school production or school cost function, school productivity, how to measure school productivity and the effects of free school choice. Only a few MA studies are categorised as generic knowledge about the school production process or as productivity studies, while a comparatively larger proportion are categorised as reform and effect studies or as studies focusing on the design and use of management accounting and control systems. Seven of the eight MA reforms and effect studies focus on the effects of devolved financial management and formula funding, while only three of the 30 reforms and effect studies from the SE journals focus on this issue.

The majority of the studies reviewed are concerned with school production, school productivity and the effects of reforms on the school level, and only a minor proportion of the studies focus on school districts or local school authorities. The latter group are studies on school resource allocation and school district productivity (Brewer, 1996), on reasons why school districts differ with regard to school efficiency (Chalos, 1997), of local school authorities' construction of school resource allocation formulae (Edwards et al., 1996) and the survival of local school authorities after the implementation of financial management at the school level (Edwards et al., 2005).

The majority of the SE studies use empirical analysis of archival or survey data, while the majority of the MA studies are case/field studies. These differences indicate that SE and MA research are concerned with different types of research questions. The widespread analysis of archival data in SE studies indicate that this research is concerned with “what”, “who”, “where”, “how many” and “how much” research questions (Yin, 1994), and consequently with estimation of general economic relationships and models that may also be used for predictions. In general, this type of research considers schools as “black boxes” and the studies focus on the relationships between school output and school input, or between school characteristics and school output. In addition, the majority of SE reform and effect studies focus on whether and how different incentives and reforms might affect or have affected school output or school productivity. The SE studies pay limited attention to issues such as the processes or changes that may take place inside schools for a reform to have the expected effects, or how schools and school employees cope with reforms.

The comparatively larger proportion of case/field studies in the sample of empirical MA studies indicates an interest in “how” and “why” research questions (Yin, 1994). Six of the eight MA reform and effect studies are case/field studies of schools and/or local school authorities. As opposed to most empirical SE studies, these studies do not consider schools or local school authorities as “black boxes”, but rather study whether, how and why the reforms have affected procedures or systems within schools or local school authorities and how the reforms have been coped with by schools (Broadbent & Laughlin, 1998; Edwards et al., 2000; Edwards et al., 1995; Laughlin et al., 1994) and local education authorities (Edwards et al., 2005; Edwards et al., 1996).

The differences between the reviewed SE and MA studies with respect to the methodological approaches applied reflect the competitive advantages of the two disciplines. The competitive advantage of management accountants is claimed to be their “familiarity with the systems, structures and management processes of actual enterprises” (Kaplan, 2006, p130), and the comparatively large number of case/field studies in the group of MA studies reflects this familiarity with what is going on inside organisations. However, the competitive advantages of management

accountants when compared to economists are not reflected in the issues studied in the MA studies.

### ***“Biased” MA school research***

Cost and performance measurement and management are central issues in management accounting practice and research, and Activity Based Costing (ABC) and the Balanced Scorecard (BSC) are mentioned as recent manifestations of the competitive advantages of management accountants when compared to economists (Kaplan, 2006). Even if ABC and the BSC were developed to facilitate management accounting and control in for-profit firms, both approaches are also discussed in textbooks that focus on management accounting and control in non-profit organisations (Anthony & Young, 2003) and have been implemented in public sector organisations in recent years (e.g. Arnaboldi & Lapsley, 2005; Ax & Bjørnenak, 2002; Järvinen, 2006).

In light of both traditional and more recent approaches to cost and performance measurement, one should expect several MA studies in the generic knowledge about the school production process category, which contains studies of school production and school costs, and also in the productivity studies category. However, as was mentioned above, only one of the MA studies is concerned with school costs (Bjørnenak, 2000), while the three MA studies categorised as productivity studies use economics approaches to efficiency evaluation (Chalos, 1997; Charnes & Cooper, 1980; Dopuch & Gupta, 1994) and could equally have been published in economics journals. In addition, with one exception – a study discussing formula funding and other school funding systems (Mayston, 1998) – none of the remaining MA studies are inspired by ABC or examine whether ABC might contribute to an understanding of the school production process, school costs, school productivity or management control of schools. Neither do any of the remaining studies use or discuss other traditional or more recent MA methods, systems or concepts for cost evaluation and management in a school setting.

The emergence of the balanced scorecard alongside the introduction of devolved financial management and an increased focus on output and performance evaluation

of public services in recent decades (Olson et al., 1998b) give reasons to expect more MA studies focusing on school performance evaluation and performance management systems in schools. However, although three of the MA articles study or discuss performance measurement systems, none of these examine the design and use of management control systems within schools or the balanced scorecard in a school setting.

### ***Limited communication***

The similarities and differences between SE and MA research on schools indicate that there are potential positive effects of communication between researchers from the two disciplines on schools and education. However, the analysis of the recent communication structure between the two fields indicates only very limited communication.

As opposed to this apparent lack of communication between SE and MA researchers on schools, communication between the fields of economics and accounting/management accounting is known from other areas of research. Agency theory, game theory, signalling and incomplete contracts are some examples of economic theory being applied to accounting and management accounting problems (e.g. J. Christensen et al., 1994; P. O. Christensen & Feltham, 2004; Milgrom & Roberts, 1992), and economic theories, as well as estimation methods based on economic theory, are used in research on such problems as productivity evaluation (e.g. Chalos, 1997; Dopuch & Gupta, 1997), performance evaluation in a principal-agent setting (e.g. Budde, 1999; Demski & Sappington, 1999) and cost management (e.g. Bromwich & Hong, 1999). In addition, the *Journal of Accounting and Economics* publishes research in the border area between the two fields. The presence of this communication between the two disciplines in other fields of research makes it reasonable to ask whether the results from the above analysis of the communication structure in education are biased for any reason.

### **Are the MA and SE samples representative?**

One possible reason for the observed limited communication between SE and MA research on schools may be that the two groups of studies are not representative

selections of SE research and MA research respectively on schools, with the consequence that analyses of the communication structure between more representative selections might reveal more communication between the two disciplines.

The SE research reviewed may be biased due to the limited number of journals searched, the volume of articles taken from the two journals respectively and by different research traditions between countries and/or continents due to editorial policy and/or coincidence. The two SE journals only publish some of the total SE research on the school levels discussed in this paper. In addition, of the 90 SE articles 66 are published in the *Economics of Education Review*, a journal with its origins in the USA and with a majority of the editorial board members from that country.<sup>3</sup> The remaining SE studies are published in *Education Economics*, which has a more equal spread of members from the USA and other countries on its editorial board.<sup>4</sup> However, comparisons of the issues studied and methods applied in the studies from the two SE journals do not indicate significant differences, either with respect to the issues studied or the methods applied.<sup>5</sup> In addition, a comparison with Hanushek's (2002) summary of SE research indicates that the school economics articles included in the present study are representative of the issues discussed by school economics researchers in studies of the school production process, school productivity and whether and how school production is affected or may be affected by political decisions and reforms. Consequently, it is reasonable to assume that the SE studies reviewed are a representative selection of SE research on the issues of interest for the present study.

The MA journals have been searched with wide keywords and it is reasonable to assume that the searches have identified nearly all the articles studying schools or school-related issues. In addition, the number of MA journals searched is relatively large. Therefore, and in light of management accountants' limited interest in public sector research (Scapens & Bromwich, 2001; Shields, 1997), it is reasonable to assume that the articles identified in the searches are also a representative selection of

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<sup>3</sup> [http://www.elsevier.com/wps/find/journaleditorialboard.cws\\_home/743/editorialboard#editorialboard](http://www.elsevier.com/wps/find/journaleditorialboard.cws_home/743/editorialboard#editorialboard).

<sup>4</sup> <http://www.tandf.co.uk/journals/journal.asp?issn=0964-5292&linktype=5>.

<sup>5</sup> see tables 1 and 2, appendix 2

MA research on schools and school-related issues. Consequently, there is no reason to believe that the limited communication observed between the two disciplines is caused by biased samples of SE and/or MA research on schools.

### **Is MA school research representative for MA research as such?**

Another possible reason for the limited communication between the SE research and MA research that has been reviewed is that the MA studies do not study issues that are expected to be studied by management accountants. Management accountants' interest in and knowledge about cost and performance measurement and management give reason to expect a larger number of studies applying traditional or more recent approaches to school cost and productivity, as well as more studies of management control systems in schools. However, as the review of the MA school articles has shown, there is a gap between the issues one would expect to be studied and the issues actually examined in MA research on schools. In other words, MA research on schools and school issues is not only limited in volume, but is also biased when compared to the issues that one might expect to be covered by management accountants. Consequently, there is at least a theoretical possibility that a larger number of MA studies looking at these expected issues might result in more communication between the two disciplines and a greater aggregation of knowledge with regard to schools and education.

### ***The direction of communication***

It has been mentioned above that communication between economics and accounting is known from other fields of research. In addition, it is claimed that the main direction of this communication is from economics to accounting; i.e. accounting researchers import theories from economics (J. Christensen et al., 1994). The few cross-discipline references found in the articles reviewed in this study indicate a similar pattern of communication. References in the MA studies to economics literature indicate some communication and possible learning from economics, but the lack of references in SE studies to MA literature indicate scant communication and learning from MA research on schools in SE research. Consequently, it seems that economists hardly draw on "the management accountants' competitive advantage over economists" (Kaplan, 2006, p130). However, for the same reason that it was



difficult to conclude whether there had been no communication due to a bias in the issues studied in the MA research on schools, it is likewise unreasonable to conclude that the direction of communication would have been from economics to management accounting if the latter's research on schools had focused on issues one would expect to be studied by management accountants.

### ***Limited MA school research***

Compared to MA research on other public services such as hospitals, MA research on schools and school issues is limited with regard to both the volume of studies and the range of issues studied. One possible explanation might be that schools are normally small organisations compared to organisations such as hospitals. In addition, schools are normally managed and controlled according to rules, regulations and curriculum given by higher school authorities. This might imply that there is a limited demand for sophisticated management accounting and control systems and procedures in schools, and that there may be few issues and challenges of interest for management accountants in schools.

On the other hand, the findings and results from the studies of school costs, the school production process and the effects of reforms reviewed in this essay indicate that, even if schools are relatively small organisations, there is a need for more knowledge on and understanding of the school production process, school costs, school productivity and the effects of reforms. This is also true with regards to schools' internal management accounting and control systems and how superior authorities control schools. In addition, recent reforms such as devolved financial management may have made new or altered demands on schools' internal management accounting and control systems, and schools might have implemented new or altered management control systems or routines in order to cope with the changes.

A second possible explanation for the limited management accounting research on schools concerns the possibility that schools and school employees might want to protect their organisation from visibility and changes. Research has found that schools protect their internal operational activities from the effect of reforms (Broadbent & Laughlin, 1998; Edwards et al., 2000; Edwards et al., 1995). Although these and other

studies have made investigations at the school level, the limited amount of studies focusing on school-level issues that have gathered information directly from the individual schools would seem to propose that schools do protect their actual activities from external access and visibility. In most countries schools are exposed to limited or no market competition and this lack of competition combined with limited control from superior authorities might make it possible to achieve and maintain slack (x-inefficiency) (e.g. Leibenstein, 1966, 1975; Lukka, 1988). Therefore, it is possible that schools and school employees seek to prevent MA research on schools in the form of case studies applying an ABC approach that would seek to estimate school activity costs and to understand the school cost structure in order to maintain slack and protect themselves from demands for increased efficiency.

Other possible explanations might be that management accountants regard research on small and public organisations as less meritorious than research on larger organisations, that what is researched follows traditions with regard to the issues and types of organisations focused on and that what is researched depends on the ability to gain access to organisations or data.

### ***How MA research could contribute to SE research***

Although research by management accountants on schools and education has been limited, an increase in management accounting research in this area might supplement and contribute to school economics research. The interest of management accountants in what is going on inside organisations, how organisations and individuals respond to changes and reforms, their different approaches to cost and performance measurement and management, along with their familiarity with and comparatively widespread use of case/field studies, indicate that MA research might contribute to the understanding of why and how reforms lead to, or do not lead to, the expected effects; and also to a greater understanding of the school production process, school costs and how schools and school performances are managed and controlled. In turn, this improved insight into school production, school costs, management control in schools and why the relative success of reforms in their effects may contribute to a clarification of why SE school production and school efficiency estimations show ambiguous results (e.g. Hanushek, 1981, 1986, 1997, 2002).

Activity-based costing and the balanced scorecard are recent management accounting developments in cost and performance management. Research on school costs and the school production process based on ABC and performed as a case/field study is one example of how management accounting research might contribute to traditional school economics research. Decomposition of the school production process into activities by use of an ABC approach, as well as ABC's distinctions between theoretical, practical and employed capacity, may both broaden an understanding of schools' internal activities and processes and develop insight into school costs, the school production process and school productivity. Furthermore, this decomposition of the school production process into activities may create the possibility of performance measurement and efficiency evaluation on the activity level, as well as assessing whether activities are value adding or not, for instance inspired by the value creation model approach (McNair, Polutnik, & Silvi, 2001). An activity-based approach to school cost and production evaluation might also provide information for school efficiency improving decisions.

Schools are characterised by multiple objectives (Engert, 1996) and, as with other professional services, evaluation of the services, or at least some service characteristics, requires professional judgement (Silvestro, 1999). In addition, school production is a cumulative process and the results of present actions and efforts have effects in the long run, as well as in the short run. For these reasons, the BSC with its focus on past and future performances, and on internal and external perspectives, might be an interesting approach to schools' internal performance management and to the control of schools by higher school authorities. In addition, the BSC may provide an interesting framework for studies of performance measurement and performance control in schools and in education more widely, and might offer information and knowledge not achieved in previous studies of schools and school performances.

Case/field studies based on ABC, BSC and more traditional MA approaches to cost and performance measurement and management may not only result in new or revised knowledge of schools and the school production process, they may also result in new or refined theories (Eisenhardt, 1989; Keating, 1995). In turn, these new or revised theories can be tested on larger data samples according to the traditions of economics.

The improved knowledge on school costs, the school production process, school productivity and the effects of reforms, as well as how schools and school resources can be managed and controlled, may have positive effects on the decisions and management control systems of both schools and central and local school authorities.

## **Conclusions and proposals for future research**

This study addresses the question of communication between disciplines and possible positive effects of communication (Lukka & Granlund, 2002) between economics and management accounting research on schools. The differences between the two disciplines with regard to the issues studied and research approaches applied is assumed to be a condition for positive effects from communication. Therefore, the objectives of this study have been to investigate the issues studied, research approaches and data applied in SE and MA research on schools, as well as the existing communication structure between the two disciplines in a sample of SE and MA research on schools.

Two SE research journals and 13 MA research journals were searched to identify research on the school production process, school costs, school productivity, the effects of reforms or other policy decisions and on the design and use of management accounting and control systems in schools. The study has focused on school levels approximately corresponding to primary and lower secondary school, and the search and selection criteria identified 15 MA articles and 90 SE articles.

Although the number of MA studies is limited when compared to the number of SE studies, the comparison of the two groups of research revealed significant differences with respect to the issues studied and to the methodological approaches and data used in the studies. While about 1/3 of the SE studies are categorised as concerning generic knowledge about the school production process and reform and effects studies, and about 25% are categorised as productivity studies, more than 50% of the MA studies are reform and effect studies. Only 1 of the 15 MA studies is categorised as a generic knowledge study, while the proportion of MA productivity studies are about the same as in SE research. The proportion of studies categorised as design and use of

management accounting and control systems is larger in the MA field. With regard to the research approaches applied in the two groups of studies, the comparison between MA and SE studies proposes that SE research is mostly concerned with estimation of models based on economic theory and using large samples of archival data, while the MA studies to a larger extent use a case/field study approach. Consequently, the differences between the MA and SE articles reviewed suggest that there might be potential positive effects of communication between the two disciplines.

The analyses of the communication structure between the two fields of research indicate that the two groups of studies belong to different disciplines, that there is almost no communication between the disciplines and that the direction of the very limited communication is mainly from economics to management accounting. Consequently, the communication structure analyses propose that there is almost no learning between the two disciplines and that the potential positive effects of communication between the two disciplines are hardly achieved.

In general, management accountants and MA research are concerned with cost and performance measurement and management, while their interest in and knowledge about what is going on inside organisations, along with their approaches to cost and performance measurement and management, are claimed to be their competitive advantages when compared to economists (Kaplan, 2006). This interest in what is going on inside organisations implies that MA research's main contribution to knowledge on schools and school production primarily relates to the first "transformation" in the school production process; i.e. the production process from input to school activities, or services directly produced (Bradford et al., 1969). In addition, management accounting approaches such as the value creation model (McNair), and indeed MA theories and research on product attributes in general, might contribute to knowledge on the second transformation process – the transformation of school activities to school output. However, the review of the 15 MA studies revealed that MA school studies applying traditional or recent cost and performance measurement and management approaches, as well as studies of school service attributes, are as good as absent. Consequently, the MA school studies do not study issues that one would expect to be studied and do not apply the theoretical approaches normally used by management accountants.

Future MA research which studies or uses traditional or more recent MA approaches on schools and education might contribute to knowledge on the school production process and school costs, as well as understanding the effects of reforms and the design and use of management control systems in education. In addition, there is at least a theoretical possibility that school studies in line with the competitive advantages of management accounting research might lead to greater communication and learning across the two disciplines.

Activity Based Costing and the Balanced Scorecard are recent MA developments that might contribute to contemporary knowledge on and understanding of the school production process, school costs and school performances. One proposal for future MA research on schools is to apply activity-based costing in studies of the school production process. Other proposals are to discuss analytically whether a balanced scorecard approach to performance measurement and management may be useful for control of schools, and to apply a constructive approach to investigate whether and how activity-based costing and the balanced scorecard are useful approaches to school cost and performance management. Studies of the design, use and diffusion of both traditional and recent cost and performance management approaches in schools are additional proposals for future MA school research.

## Appendix 1: Studies reviewed

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Adnett & Davis, 2005	Education Economics	Reform and effect studies, free school choice	Analytical discussion			"... examine the attractions of greater intra-school competition and investigate whether its general neglect in recent theoretical and policy debates is warranted".
Ammermüller, Heijke & Wößmann, 2005	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	Former Eastern European countries	"... analyzes and compares the production of schooling quality in seven Eastern European transition countries striving for EU accession".
Andrews, Duncombe & Yinger, 2002	Economics of Education Review	Productivity studies	Literature review			"... define the factors affecting economics of size and update the literature since 1980".
Bacdayan, 1994	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"... describes in both economic and mathematical terms the learning production process at the individual level and derives from that profile a model to determine which factors affect that process".
Baker, 2001	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"... to test weather flexible non-linear models can reveal otherwise unexpected patterns of relationship in typical school productivity data".
Ballou, 2001	Economics of Education Review	Reform and effect studies, other	Empirical studies using archival or survey data	Archival data	USA	"The notion that merit pay has failed because it is inherently ill suited to teaching, and not because of weak management, are tested by comparing the use of performance based pay in public and private schools".
Barnett et al., 2002	Education Economics	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	Northern Ireland	"... investigating the relationship between school performance and school size".
Barrow, 1991	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Archival data	UK	"... a cost frontier model of local education authorities in England is estimated, relating their average cost to a number of output and socio-economic background variables".

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Behrman, 1996	Economics of Education Review	Productivity studies	Literature review			"... revisits methodological issues pertaining to measuring the cost-effectiveness of schooling"
Betts & Shkolnik, 2000	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"... to analyze both the overall effect and the differential effect of a formal policy of ability grouping".
Bifulco & Bretschneider, 2001	Economics of Education Review	Productivity studies	Analytic, mathematical		Simulated data	Addresses "how appropriate existing efficiency measures are for the purposes of a performance-based school reform".
Bjørnenak, 2000	Management Accounting Research,	Generic knowledge about the school production process	Method triangulation	Survey + interviews	Norway	"... examines different cost driver approaches in a public sector setting".
Boardman, Darling-Hammond & Mullin, 1982	Economics of Education Review	Reform and effect studies, financing	Empirical studies using archival or survey data	Archival data	USA	Develops and tests "a model of teacher salaries and teacher supply and demand ... as an aid in analyzing educational finance reforms".
Borland & Howsen, 2000	Education Economics	Reform and effect studies, free school choice	Empirical studies using archival or survey data	Archival data	USA	"1) to correct for the bias and inconsistency in the estimated coefficients of the degree of market competition as well as for teacher salary; and 2) to identify those variables of administrative importance over which policy makers have control".
Brewer, 1996}	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"... to examine the extent to which school districts allocate personnel (and expenditures) to instructional and noninstructional uses, and to determine if this allocation affects a district's educational productivity".
Broadbent & Laughlin, 1998	AAAJ	Reform and effect studies, devolved financial management	Case/field study	Interviews	UK	Focuses on effects of the "New Public Management Reforms" and "on the managerial and organizational effects of these accounting and finance-led changes in the specific context of schools and GP practices".
Broadbent, Jacobs & Laughlin, 1999	Management Accounting Research	Design and use of management accounting and control systems	Analytical discussion		UK + New Zealand	"... contrasts educational reforms in New Zealand and the U.K. exploring the role of accountability in processes of management control."



Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Brown & Saks, 1987	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	1) "... to uncover the underlying production technology present in the operation of classrooms." 2) to begin to understand the role the teachers' values play in allocating time to different pupils".
Brown, 1991	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"... whether gender and SES (socioeconomic status) level affect the efficiency of student's use of school resources, or whether gender and SES level affect the allocation of school resources to students because teachers value differently the achievements of students who possess these traits".
Brown, 1992	Economics of Education Review	Other	Analytic mathematical			"... examines, from an economic perspective, the question of why government operation of schools is such a pervasive phenomenon".
Chabotar, 1989	Economics of Education Review	Productivity studies	Method triangulation	Survey, interviews, documents	USA	"... to facilitate decision making about magnet schools by examining three key cost questions: 1) Do magnet schools cost more than non-magnet schools? 2) Do specific types of magnet schools cost more than others? 3) Do magnet schools with higher costs have higher levels of integration and educational quality than magnet schools with lower costs?"
Chalos, 1997	Financial Accountability and Management	Productivity studies	Empirical studies using archival or survey data	Archival data	USA	"... examines the size, type and source of educational operating expenditures as explanators of the relationship between educational spending and budgetary inefficiency".
Charnes & Cooper, 1980	Accounting, Organizations and Society	Productivity studies	Empirical studies using archival or survey data	Archival and survey data	USA	"... want to introduce a new way to evaluate the efficiency of management in the not-for-profit entities that constitute such a large (and growing) part of our economy".
Cooper & Cohn, 1997	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"... provides results of research on educational achievement in the state of South Carolina".
Corman, 2003	Economics of Education Review	Reform and effect studies, other	Empirical studies using archival or survey data	Archival data	USA	Investigates effects of state education policies on grade repetition.
Correa, 1993	Education Economics	Generic knowledge about the school production process	Analytic mathematical			"... the assumptions and methods of economic theory are used to study the behavior of a rational teacher and to prove that an increase in class size reduces student achievement".

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Daneshvary & Clauretje, 2001	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Survey data	USA?	"... explores the cost savings (efficiency) of a year-round schedule versus a traditional 9-month schedule for schools".
Dee, 1998	Economics of Education Review	Reform and effect studies, free school choice	Empirical studies using archival or survey data	Archival data	USA	Examines the importance of some "specification issues by generating new evidence on the relationship between competition form private schools and achievement in public schools".
Deller & Rudnicki, 1993	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Archival data	USA	"... examines the efficiency of Maine elementary schools in the maximization of student achievement, given certain student and community characteristics."
Dewey, Husted, & Kenny, 1999	Economics of Education Review	Generic knowledge about the school production process	Method triangulation	Estimates from other studies + archival data	USA?	Reexamines "the educational production function literature, focusing on the role of specification in determining the significance of education inputs".
Dopuch & Gupta, 1997	Journal of Accounting and Economics	Productivity studies	Empirical studies using archival or survey data	Archival data	USA	"... illustrates how stochastic frontier estimation (SFE) can be used to estimate benchmark performance standards which control for differences in the environments of the benchmarked operating unit".
Downes, 2000	Economics of Education Review	Reform and effect studies, financing	Empirical studies using archival or survey data	Archival data	USA	"Assess the impact of fiscal dependence on educational spending".
Duncombe & Yinger, 2000	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"Explains one method for developing a comprehensive educational cost index, and show how to incorporate it into a performance-based foundation aid system".
Duncombe & Yinger, 2005	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"This paper provides a guide to statistically based methods for estimating the extra costs of educating disadvantaged students, shows how these methods are related, and compares state aid programs that account for these costs in different ways".
Duncombe et al., 1995	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Archival data	USA	Studies "potential cost savings from consolidation of New York school districts".
Edwards et al., 1995	Financial Accountability and Management	Reform and effect studies, devolved financial management	Case/field study	Interviews, observation in meetings, documents	UK	"Discusses the development and the educational impact of local management of schools in Great Britain on budgets and accountability",

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Edwards et al., 1996	AAAJ	Reform and effect studies, devolved financial management	Case/field study	Interviews, observation in meetings, documents	UK	"Examines the construction of the funding formula, following the 1988 Education Act, used to determine the levels of devolved budgets in three English local education authorities (LEAs)".
Edwards et al., 1999	Critical Perspectives on Accounting	Design and use of management accounting and control systems	Analytical discussion		UK	"... analyze the processes which have structured the emphasis upon budgeting and accounting in the Local Management of Schools initiative".
Edwards et al., 2000	Financial Accountability and Management	Reform and effect studies, devolved financial management	Case/field study		UK	"... examines the connections between the planning of educational strategies and the budgeting of resources in schools by investigating empirically the budgeting and planning process in a sample of schools located in three North West of England LEAs".
Edwards et al., 2005	Accounting, Auditing and Accountability Journal	Reform and effect studies, devolved financial management	Case/field study	Interviews	UK	"Seeks to explain the survival of the Local Education Authority (LEA) as an organizational form despite the significant reform of UK education that created a hostile environment for them".
Estelle, King & Suryadi, 1996	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Archival data	Indonesia	"... investigates the impact of public vs. private management of schools on school inputs, costs and efficiency. It also examines the determinants of the level of the relationship between public and private finance".
Fielding, 1995	Education Economics	Productivity studies	Method triangulation	Archival data + case studies	UK	Studies "whether there are differences in the cost effectiveness of the four different types of institutions as reflected by their different organizational structures".
Friedman, 1997	Education Economics	Reform and effect studies, free school choice	Analytical discussion			Discusses free school choice, private schools and school vouchers.
Glewwe, 1997	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data		The Philippines	Shows how to consider a specification that accounts for the shape of the distribution of peer effects in estimation of peer effects, and "how lack of 'full' flexibility can lead to seriously misleading results".
Glomm, Harris & Lo, 2005	Economics of Education Review	Reform and effect studies, free school choice	Empirical studies using archival or survey data	Archival data	USA	Studies whether charter schools increase school efficiency and innovation by analysis of the location and entry of charter schools.
Goldhaber, 1996	Economics of Education Review	Reform and effect studies, free school choice	Empirical studies using archival or survey data	Archival data	USA	The paper focuses on two questions: "Do private schools do a better job on educating students than public schools?" and "How do parents select schools?"

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Goldhaber, Brewer & Anderson, 1999	Education Economics	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	Extends prior research by "estimating a three-way error component model that allows us to apportion the variance in 10th-grade mathematics achievement between school-level variables, teacher-level variables and class-level variables" and "... determine the relative importance of both observable and unobservable school, teacher and class effects".
Grosskopf & Moutray, 2001	Economics of Education Review	Reform and effect studies, devolved financial management	Empirical studies using archival or survey data	Archival data	USA	"... to assess whether the earlier experiment in site-based management really failed to improve performance in Chicago's high schools."
Hayneman, 1997	Education Economics	Reform and effect studies, free school choice	Analytical discussion			"... explores the question of school choice with particular reference to policies in Eastern Europe and the former Soviet Union, and how these have been viewed by Glenn in particular".
Hoенack, 1994	Economics of Education Review	Other	Analytical discussion			"... to propose an increased focus in the economics of education on incentives that influence organizational behavior and to suggest appropriate research directions and methodologies".
Hoенack, 1997	Economics of Education Review	Reform and effect studies, free school choice	Empirical studies using archival or survey data	Archival data	USA	"... presents a structural model of the demand and supply of enrollment places in parochial schools and applies this model in the evaluation of alternative designs of voucher policies".
Hought & Warburton, 1986	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	UK	"... reviews the work that has been published in the U.K. in the field of school costs, resources and input-output relationships".
Ismail & Maurice, 2006	FAM	Reform and effect studies, financing	Empirical studies using archival or survey data	Survey data	UK	"... to examine the experiences of the users of PFI school facilities that are up and running".
Jimenez & Paqueo, 1996	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Archival data	The Philippines	"Are public schools that rely on local resources for a greater share of their finance more cost-effective? Could financial decentralization lead to more efficient schools?"
Jimenez, 1986	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Archival data	Bolivia and Paraguay	"... attempt to extend the existing literature on educational cost functions by employing flexible cost functions, by examining possible complementarities in the provision of different levels of schooling and by studying disaggregated school level data from two developing countries".

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Katzman, 1985	Economics of Education Review	Reform and effect studies, devolved financial management	Case/field study	Interviews	USA	"Examines the impact during a period of extensive curricular and school finance reform in Texas of the implementation of the block grant provisions of Chapter 2 of the <b>Education</b> Consolidation and Improvement Act".
Kemmerer & Wagner, 1985	Economics of Education Review	Reform and effect studies, other	Analytical discussion			"... to examine the key proposals for improvements in elementary and secondary education for an economic perspective, and to draw upon the available research to assess their likely effects".
Kuziemko, 2006	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"... correct the bias that has made the results of past papers difficult to interpret. To isolate the effect of school size from that of any unobserved variables".
Ladd & Walsh, 2002	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"1: to contrast student performance level measures to "value added measures that would more accurately measure a school's efficiency" and 2: "to evaluate such measures on their own terms; that is, as measures of school-specific gains in student performance".
Lamdin & Mintrom, 1997	Education Economics	Reform and effect studies, free school choice	Literature review			Take stock of school choice in practice in US, discuss how school-choice initiatives can be evaluated, and suggest directions for future research.
Lamdin, 1995	Education Economics	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	Analyses the direct effect of school size on student achievement.
Landon, 1998	Economics of Education Review	Design and use of management accounting and control systems	Empirical studies using archival or survey data	Archival data	Canada	"... empirically examines whether the magnitudes of different types of education costs depend on the degree of centralization of spending control".
Lankford & Wyckoff, 1997	Economics of Education Review	Other	Empirical studies using archival or survey data	Archival data	USA	"... examine how school districts allocate money to teacher salaries and whether the observed salary expenditure patterns are consistent with what is known about using teachers to improve the learning of students".
Lassibille & Tan, 2001	Education Economics	Productivity studies	Empirical studies using archival or survey data	Archival data	Tanzania	"... we turn to examine the extent to which the government's policy has also led to increased efficiency in school operations as judged by difference in the student learning outcomes across public and private schools".

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Laughlin et al., 1994	AAAJ	Reform and effect studies, devolved financial management	Case/field study	Interviews	UK	Looks at the way the new financial responsibilities, the management of devolved financial resources on schools, are handled.
Levacic & Vignoles, 2002	Education Economics	Generic knowledge about the school production process	Literature review			"... seeks to evaluate existing school production function research, with the ultimate aim of encouraging further research in this field".
Levacic, 1990	Financial Accountability and Management	Design and use of management accounting and control systems	Analytical discussion			"... to examine theories of choice in the context of education. In doing so we will place primary emphasis on comparing a system of marked choice with a system of public choice".
Levin & Driver, 1997	Education Economics	Reform and effect studies, free school choice	Empirical studies using archival or survey data	Other	USA	"... to outline a process for estimating the costs of the overriding supportive framework for educational vouchers".
Levin & Woo, 1981	Economics of Education Review	Generic knowledge about the school production process	empirical studies using archival or survey data	Other	USA	"... to estimate the costs and cost feasibility of utilizing computer-assisted instruction (CAI) for compensatory education".
Levin, 1991	Economics of Education Review	Reform and effect studies, free school choice	Analytical discussion			"... to examine theories of choice in the context of education. In doing so we will place primary emphasis on comparing a system of marked choice with a system of public choice".
Levin, 1997	Economics of Education Review	Productivity studies	Analytical discussion			"... taking five key dimensions of efficient production organizations and showing how they have been applied directly to improving school productivity through a national school reform effort, The Accelerated School Project".
Mancebon & Bandres, 1999	Education Economics	Productivity studies	Empirical studies using archival or survey data	Archival data	Spain	"... to illustrate that measuring the efficiency of the education sector requires a highly detailed breakdown of the education service production process".
Mayston, 1996	Education Economics	Generic knowledge about the school production process	Analytical discussion			Puts forward an alternative explanation for the lack of findings of a significant relationship between educational attainment and expenditures per pupil.

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Mayston, 1998	Management Accounting Research	Reform and effect studies, devolved financial management	Analytical discussion			"... examines the relative merits of a system of devolved budgeting and formula funding compared to other possible approaches to public sector budgeting from the viewpoint of the extent to which these different approaches are likely to promote equity in the funding of public services to disadvantaged groups".
Melck, 1985	Economics of Education Review	Reform and effect studies, devolved financial management	Analytical discussion			"... attempts to outline the consequences of the financial freedom block grants offer, firstly from a macroeconomics perspective in which the effects upon educational autonomy and economic efficiency are analyzed, and secondly from that of macroeconomics in which grants are viewed as an instrument of overall educational planning".
Millot & Lane, 2002	Education Economics	Productivity studies	Empirical studies using archival or survey data	Archival data	Middle Eastern contries	"... investigates the importance of time in contributing to the efficiency of the educational process by developing a typology for the addition of the time variable in the production of education".
Monk, 1984	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	Address "how resources are allocated once they reach schools and class rooms" by "developing an economics analysis of the allocation of teacher resources among students at the class room level".
Monk, Hussain & Miles, 2000	Economics of Education Review	Reform and effect studies, other	Method triangulation	Archival data and case	USA	"1. What explains the willingness or ability of school districts to increase Regents achievement examination participation rates? 2. What have been the effects on student performance? and 3. What have been the changes in resource allocation behavior?"
Parry, 1997	Education Economics	Reform and effect studies, free school choice	Empirical studies using archival or survey data	Archival data	Chile	"... to provide new evidence on the voucher debate by describing and evaluating a voucher system operational at a national level".
Primont & Domazlicky, 2006	Economics of Education Review	Reform and effect studies, other	Empirical studies using archival or survey data	Archival data	USA	Focus on the No Child Left Behind (NCLB) Act.1) "... consider how efficiently school districts are currently using their resources to improve academic performance". 2) "since school districts failing to make adequate yearly progress could face sanctions under NCLB, we simulate the effects of these sanctions on failing school districts".
Pritchett & Filmer, 1999	Economics of education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Other - estimates from other studies	Brazil and India	Investigates why evidence is grossly inconsistent with the assumption that resources are allocated to maximize educational output.

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Psacharopoulos, 1996	Economics of Education Review	Other	Analytical discussion			"... presents a systematic taxonomy of research areas in the economics of education and gives a number of key topics that deserve more research attention in the future".
Rangazas, 1997	Education Economics	Reform and effect studies, free school choice	Analytic mathematical			"... examines the theoretical presumption that private school vouchers will increase the quality of education in public and private schools".
Rapp, 2000	Education Economics	Reform and effect studies, free school choice	Empirical studies using archival or survey data	Archival data	USA	"... tests whether choice influences the behavior of public school teachers, arguably the link between policy and outcome".
Rapple, 1992	Economics of Education Review	Reform and effect studies, financing	Analytical discussion		UK	"... examine a comprehensive 19th century system of accountability, the Revised Code's "Payment by Results", which endured in English and Welsh elementary schools from 1862 until 1897".
Rice, Croninger & Roellke, 2002	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	Investigates impacts of block scheduling on classroom practice and student learning.
Rickman & Parker, 1990	Economics of Education Review	Other	Empirical studies using archival or survey data	Archival data		Investigates empirically the effect of a wage differential between a teacher's actual or current wage and the wage that could be earned in alternative occupations upon the decision of primary and secondary school teachers to leave the teaching profession.
Riew, 1981	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Archival data	USA	"... presents an analytical framework enabling the examination of the cost impact of school reorganization that specifically involves the shifting of ninth-graders to senior high school and simultaneously transferring sixth-graders to junior high schools".
Rosenthal, 2003	Economics of Education Review	Reform and effect studies, other	Empirical studies using archival or survey data	Archival data	UK	"to investigate the direct influence of Ofsted inspections on the exam performance of inspected schools for the year of the inspection, reflecting one of the explicitly stated aims of the agency".
Ruggiero, 2006	Economics of Education Review	Productivity studies	Analytic, mathematical	Simulated data		Investigates whether the use of aggregated data reduces the measurement errors and result in more precise efficiency estimates than more disaggregated data.
Scott, 2000	Education Economics	Reform and effect studies, free school choice	Analytic mathematical			Studies "whether pre-college school choice might help pupils, especially disadvantaged pupils".
Sengupta & Sfeir, 1986	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Archival data	USA	Two generalised aspects of scale economics in schooling are empirically tested.



Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
Shah, 1998	Education Economics	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival + survey data	Australia	"In this study, a model is developed to analyze the cost per student at the class level".
Smet, 2001	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Archival data	Belgium	"... to determine the optimal size of educational organizations".
Southwick & Gill, 1997	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	The study empirically examines the effect of unified salary schedule on the output of the secondary school system.
Stern, 1989	Economics of Education Review	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival data	USA	"... to measure and compare the joint and separate association of these four factors with student achievement, using data from grades 3 and 6 in Californian public schools". (The four factors: The teacher/pupil ratio, the level of starting salary schedule, the amounts by which the salary schedule rewards teachers for seniority and further education and the levels of seniority and further education that incumbent teachers have actually acquired.)
Stoddard, 2005	Economics of Education Review	Other	Empirical studies using archival or survey data	Archival data	USA	Compares adjustment of teacher salaries by cost of living with adjustment of teacher salary with non-teacher salaries.
Tao & Yuan, 2005	Economics of Education Review	Productivity studies	Empirical studies using archival or survey data	Survey data	Taiwan	To "demonstrate the importance of commuting costs while determining the optimal school scale".
Tsang, 1994	Education Economics	Generic knowledge about the school production process	Empirical studies using archival or survey data	Archival + survey data	China	"The paper is aimed at providing a review of the current state of knowledge, and identify knowledge gaps and areas for future research on education costs in China".
Walden & Sogutlu, 2001	Economics of Education Review	Other	Empirical studies using archival or survey data	Archival data	USA	"... addresses determinants of intrastate variation in teacher salaries".
Wassmer & Fisher, 2002	Economics of Education Review	Other	Empirical studies using archival or survey data	Archival data	USA	"... explore the past, present, and future use of various forms of charges in the United States' system of primary and secondary public education".

Reference	Journal	Topic	Method	Type of data	Origin of data	Objective/research question
West & Pennell, 1997	Education Economics	Reform and effect studies, free school choice	Analytical discussion			"... examines the educational reforms relating to school choice that were introduced in England and Wales by Conservative governments during the 1980s and the 1990s".
Winkler & Rounds, 1996	Economics of Education Review	Reform and effect studies, free school choice	Empirical studies using archival or survey data	Archival data	Chile	Studies "the Chile reform"; "What happened to the market shares of the two types of schools - municipal public and subsidized private - eligible to receive vouchers?" "How did equity in school inputs and outputs between socioeconomic groups change as a result of the reform?" and "is there any difference in cost-effectiveness between the municipal public and the subsidized private schools?"
Worthington, 2001	Education Economics	Productivity studies	Literature review			"This paper attempts to provide a synoptic survey of the comparatively few empirical analyses of educational efficiency using frontier efficiency measurement techniques".
Wyckoff & Naples, 2000	Economics of Education Review	Reform and effect studies, financing	Analytical discussion			"... provides background and context to the research symposium, Educational Finance to Support High Learning Standards. It also briefly summarizes the papers in this volume that were part of this symposium."

## Appendix 2: Additional tables

**Table 1: Issues studied in the SE articles by journal**

	Economics of Education Review	Education Economics	Total
Generic knowledge	21	8	29
Productivity	17	5	22
Reform and effect studies	19	11	30
Management accounting and control studies	1	0	1
Other	8	0	8
<b>Total</b>	<b>76</b>	<b>24</b>	<b>90</b>
	<b>Value</b>	<b>Df</b>	<b>Asymp. Sig. (2-sided)</b>
Pearson Chi-Square	4.994(a)	4	0.288
N of Valid Cases	90		

(a) 3 cells (30,0%) have expected count less than 5. The minimum expected count is 0.27.

**Table 2: Methods applied in the SE articles reviewed, by journal**

	Economics of Education Review	Education Economics	Total
Empirical studies using archival or survey data	49	12	61
Analytical discussion/ historical analysis.	9	5	14
Analytic mathematical	2	3	5
Case/field studies	1	0	1
Literature review	2	3	5
Method triangulation	3	1	4
<b>Total</b>	<b>66</b>	<b>24</b>	<b>90</b>
	<b>Value</b>	<b>df</b>	<b>Asymp. Sig. (2-sided)</b>
Pearson Chi-Square	8.163(a)	5	0.147
N of Valid Cases	90		



## Essay 2:

# Output measures for performance evaluation of professional public services

*In recent years, the New Public Management has inspired relaxed input control in favour of increased output control for Norwegian schools. However, the characteristics of schools and the school production process give reason to question whether school output measures are useful for management control of schools. This study intends to: 1) develop a framework for the evaluation of performance measures used for management control; 2) use the framework to evaluate school output measures; and 3) discuss improved and additional school performance measures. Performance measures used for management control should be relevant, precise, complete and responsive. However, the discussion of school output measures concludes that, while traditional professional school output measures such as pupils' examinations and test results, as well as consumer-evaluated school output measures like the pupils' satisfaction with their learning environments, are relevant school performance measures, these measures have limitations with respect to the precise, complete and responsive requirements. Professionally-evaluated school output measures adjusted for pupils' family background and value-added, professionally-evaluated school output measures might provide more precise information, but the measures still have limitations regarding the complete, precise and responsive requirements. School activity measures may provide more precise and complete information about the volume of actions of schools and school employees, but this type of measure does not provide information about the quality of the activities performed. Consequently, a set combining school output measures and school activity measures is recommended for management control of schools.*

## **Motivation**

Since the 1980s, New Public Management (NPM) inspired reforms have been introduced to public sectors around the world (e.g. Hood, 1995; Olson, Guthrie & Humphrey, 1998a). One type of NPM-inspired reform is “the devolvement or delegation of budgets, coupled with the attempted integration of both financial and management accounting systems and also economic-based information sets” (Olson et al., 1998b, p18), a reform that “tries to link budgets (as predetermined plans) with the reporting of results in financial and non financial terms” (Olson et al., 1998b, p18). The expected effects of this change from input control to greater financial freedom for the individual public organisation and the stronger focus on output control are increased effectiveness and efficiency in the production of public services (e.g. Olson et al., 1998b).

According to normative theory, management control systems are used to ensure that subordinate organisations or individuals (managers) make decisions to fulfil the goals of their organisation (e.g. Horngren et al., 2003). They also ensure that subordinate organisational units or individuals use their resources “effectively and efficiently in the accomplishment of the organization’s objectives” (Anthony, 1965, p17) when the actions and efforts of an organisation or individual are unobservable to their superior manager or authorities and the objectives of the different parties are not in accordance. In order to ensure that organisations fulfil their objectives efficiently and effectively, management control systems and management accounting information are used to “maintain or alter patterns in organizational activities” (Simons, 1995b), to communicate objectives and implement strategies, to secure goal congruence between the individuals’ personal objectives and the objectives of their superiors, to motivate managers and employees to work towards the organisation’s overall goals (attention directing), for problem solving (decisions) and to control performances (scorekeeping) (Anthony & Govindarajan, 2001; Anthony & Young, 2003; Horngren et al., 2003; Kaplan & Norton, 1996; Malina & Selto, 2001).

As mentioned, the NPM have inspired relaxed input control and an increased use of output control in the control of public services by superior authorities. However, the characteristics of these services give reason to ask whether service output measurement and output control is possible, whether service output measures provide information that is valuable for control of the actions and efforts of organisations or individuals to achieve organisational objectives and therefore whether the increased focus on output control is a possible and/or appropriate approach to management control of public services. Such characteristics are, for instance, that the services are intangible, that the production cannot be separated from consumption and that the consumer may be involved in the production of the services (Anthony & Govindarajan, 2001; Auzair & Langfield-Smith, 2005). In addition, several types of public services are professional services with characteristics that may further influence the possibility for or appropriateness of output control. Some of these characteristics are that evaluation of the quality of professional services might require professional judgement (Silvestro, 1999), that the professional organisation has few tangible assets and that “its principal asset is the skill of its professional staff” (Anthony & Govindarajan, 2001, p.686).

Education is one type of professional public service which has been exposed to relaxed input control and increased use of output control in recent years, and Norwegian schools have also been exposed to this type of NPM-inspired reform. Some examples of overall Norwegian school objectives are to give pupils a good general knowledge and to develop their mental and physical abilities. In addition, other types of school objectives are stated in laws, curriculum and regulations given by central and local school authorities. Traditionally Norwegian local and central school authorities have applied detailed regulations and line item budgeting to ensure that schools achieve the objectives. In recent years, Norwegian central and local school authorities have relaxed these former forms of control and implemented financial management at schools and school output control systems. However, even if school output measures such as pupils’ examination or test results have long traditions in schools, the characteristics of schools and the school production process make it reasonable to question whether school output measures provide information about the actions and efforts of schools and their employees for achieving valued school objectives.

The question of interest for this essay is whether school output measures are useful for school authorities in their management control, also referred to as performance control, of schools. This question leads on to other questions such as what characteristics should performance measures that are used for management control have, and do school output measures have these characteristics. Therefore, the objectives of the present study are: 1) to identify a set of requirements for, or characteristics of, performance measures to be used for management control; 2) to use this set of requirements to evaluate different types of school output measures; and 3) to discuss whether and how the school output measures could be improved or supplemented to be more useful for superior authorities' management control of schools.

The evaluation of school output measures based on the requirements for performance measures used for management control and the discussion of how school output measures could be improved or supplemented are illustrated by two Norwegian school performance control systems: the Norwegian national school quality control system, and a local school control system from a large Norwegian municipality. At the same time, there is an evaluation of the two systems to establish whether the output measures used in the systems provide valuable information about how the actions and efforts of schools and their employees help achieve valuable school objectives, and to determine whether and how the systems could be improved.

Natural language reasoning (Ryan et al., 2002) is used to discuss the extent to which the various types of school output measures satisfy the requirements for performance measures used for management control. This reasoning is also used to question whether and how these types of measures could be improved, and whether school activity measures of the types used in the local school control system, or indeed other types of school activity measures, might be useful for management control of schools. The discussion may contribute to existing literature on performance measurement and performance control of professional public services and, if so, the paper could be characterised as a theory-supplementing or theory-refining study (Keating, 1995). Conclusions from the discussion might also have practical implications.



The requirements for, or characteristics of, performance measures used for performance control are discussed in the next section; while characteristics of schools, the school production process and different interpretations of output from the school production process are discussed in section three. In addition, section three contains a presentation of the Norwegian school quality control system and the local school control system. Section four assesses the types of school output measures used in the school quality control systems against the requirements for performance measures used for performance control, while section five discusses possible improvements of these types of measures. School activity measures as a possible supplement to school output measures are discussed in section six. In addition, section six discusses why such apparently limited attention has been paid to school activity measures and how these might contribute to school management and control. Section seven concludes the paper and discusses some proposals for future research.

## **Characteristics of performance measures**

Output measures, as well as other types of performance measures, may be used to provide information about the actions and efforts of individuals or organisations to achieve their organisation's objectives when their actions are unobservable to their superior manager or authorities. In order to be informative about this, the performance measures should have certain characteristics, i.e. they should satisfy certain requirements.

### ***Relevant***

First of all, performance measures used for performance control should be relevant. The relevance factor of a performance measure relates to whether the measure provides information that could facilitate performance evaluation and decisions; i.e. whether the information provided by the measures "influences the economic decisions of users by helping them evaluate past, present and future events or confirming, or correcting, their past evaluations" (IASB, 2001).

As is stated above, this essay focuses on the use of performance measures for evaluating the actions and efforts of individuals or organisations to achieve their

organisation's objectives when their superiors are unable to observe their actions and efforts. Therefore, a performance measure, or set of measures, is relevant if it provides information about these actions and efforts, and consequently is "causally linked to valued organizational outcomes" (Malina & Selto, 2001, p54). In addition, the measures can be relevant (valuable) if they provide information related to other relevant performance measures and thereby makes these measures more precise (Banker & Datar, 1989). Therefore, performance measures providing information about actions and efforts that do not contribute to valued organisational objectives might also be deemed relevant.

### **Precise**

A second requirement for performance measures that are used for management control is that they should provide precise information. Whether a performance measure provides precise and trustworthy information about an individual's or an organisation's actions and efforts is a question of the validity and reliability of the performance measure.

Performance measure validity concerns whether the measure actually "measures what it is supposed to measure" (Bollen, 1989, p184). When one performance measure, or a set of performance measures, is used as in this case to evaluate actions and efforts to determine whether they contribute to the organisational objectives, the crucial questions are whether the measures really assess the actions and efforts, and the extent to which the measures are influenced by other factors or behaviours.

Reliability of a performance measures is about "the extent to which an experiment, test or any measuring procedure yields the same results on repeated trials (Cramines & Zeller, 1979, p11). The extent of reliability may depend on how the measures are specified and on performance measurement processes and routines. Lawler and Rohde (1976) and Simons (1995a) mention that performance measures should be objective. Objective performance measures are derived from known formulae, are independently verifiable (Simons, 1995a, p76) and should obtain the same value independent of the person or time of preparation. A subjective measure may "rely on personal judgement of superiors" (Simons, 1995a, p76) and may obtain different values dependent on who

is evaluating the performance, when the performance is evaluated and the actions and/or individuals evaluated. Simons (1995a) claims that a subjective measure can only be claimed to be valuable if the individual evaluating the performances is capable of “making an accurate and informed judgement about the actions of the subordinate” and “if trust between superior and subordinate is high” (Simons, 1995a, p76). Others argue that a balanced set of performance measures should include both subjective and objective measures (Kaplan & Norton, 1996).

Even if performance measures are prepared according to objective criteria or by highly-trusted individuals capable of “making an accurate and informed judgement” (Simons, 1995a), manipulations may make them imprecise, and consequently unreliable. Manipulation of performance measures is known from private sector settings (e.g. Dechow, Sloan & Sweeney, 1996; Healy & Wahlen, 1999; Schipper, 1989), for instance as a means to mislead external stakeholders to “attract external finance at low cost” or as a means for a manager to secure their own compensation (e.g. Dechow et al., 1996). Manipulation of performance measures is also known in public sector settings, for instance, in the manipulation of students’ test scores when these are used to reward or punish schools (Gay, 1990; Jacob & Levitt, 2003). In such situations, the performance measures are manipulated to show a higher performance than actually occurred. In other situations, an individual or organisation may want to hide their actual capabilities, possibly to keep a budgetary slack, to avoid reduced budgets and/or more challenging standards for the future – this is known as the “ratchet effect” (Milgrom & Roberts, 1992). Consequently, to avoid over-estimated or under-estimated performances, a performance measure or set of measures should be prepared according to specifications and routines that make it difficult for them to be manipulated.

### **Complete**

Although the requirement that performance measures should be complete (Lawler & Rhode, 1976; Simons, 1995a) might be discussed as part of the reliability characteristic (IASB, 2001), this essay discusses completeness as a separate, third requirement for performance measures used for management control. A complete measure captures all the actions and behaviours relevant to an organisation’s overall

goals and strategies. Economic profit is mentioned as the most complete performance measure, a measure that translates all the behaviours in the organisation into one measure (Simons, 1995a). However, a complete measure might include too much information and may be unresponsive to an organisation's or an individual's efforts and actions (Simons, 1995a).

In settings with multiple objectives and tasks and where the output depends on the employee's total effort and actions as well as on the allocation of effort between the different tasks, it may be difficult to develop one complete measure to control the desired actions or efforts both on the different tasks and in total. In such settings a set of performance measures might better capture the relevant actions and behaviours rather than a single measure, and a set of performance measures may also provide a more complete picture of the performances of an individual or an organisation. However, any set of performance measures should be "comprehensive but parsimonious" (Malina & Selto, 2001).

The Balanced scorecard is one example of a performance measurement and management system that should consist of a comprehensive but parsimonious set of performance measures. The balanced scorecard should provide comprehensive information about the factors or behaviours of strategic importance for the organisation and "should completely describe the organization's critical performance variables" (Malina & Selto, 2001, p53). At the same time, the number of performance measures should be limited "to keep the measurement system cognitively and administratively simple" (Malina & Selto, 2001, p53).

Incomplete measures, or a set of measures providing incomplete information, might lead to dysfunctional behaviour by the organisation or individual being controlled (Simons, 1995a). If a single measure or a set of measures does not capture all the actions and efforts required to achieve valued objectives, it may be tempting for the individual or organisation to concentrate on those areas affecting these measures at the expense of seeking to achieve unmeasured but equally-valued objectives (e.g. Rappaport, 1992). Therefore, under certain conditions no performance measures might be better than one, or a set of, incomplete measures (Holmstrom & Milgrom, 1991).

## **Responsive**

The fourth requirement for performance measures is that they should be responsive. The responsive requirement is related to the idea that performance measures should be influenceable by the individual or organisation controlled (Lawler & Rhode, 1976) and consequently sensitive to changes in the actions of an individual or organisation (Holmstrom, 1979). This also applies to the requirement that a performance measure should be related to the responsibility of a person or an organisational unit (Anthony and Young, 2003).

Although different words are used, this requirement implies that performance measures should reflect changes in actions and/or efforts, and that individuals or organisations should be able to influence the measure by changes in their actions and efforts. Furthermore, the responsive requirement is related to the controllability principle, which holds that “individuals should be held accountable only for results they can control” (Merchant, 1987, p316). Therefore, for a responsive performance measure, the individual or organisational unit controlled is responsible for and in position to make decisions and actions to help improve the performance measure, which will change in response to the efforts and actions performed.

It has already been mentioned that a set of measures may provide more relevant, precise and complete information about the actions and efforts performed than a single measure. In addition, if a measure is influenced both by the actions and efforts performed by the individuals controlled and by any events and conditions not controllable by the individual or organisation (noise), one or several additional measures may also make the total information more responsive to the changes than the one initial measure.

## **Other performance measure requirements**

In addition to the requirements discussed above, performance measures used for management control should be understandable, comparable and provide information about recent performances (e.g. Anthony & Young, 2003; IASB, 2001; Malina & Selto, 2001).

Whether a performance measure, or a set of performance measures, is understandable may depend on their characteristics, but it will also be affected by the users' knowledge of the process or activities measured; i.e. the interpreters' "cognitive model" of the process leading up to the performances or output measured and their capability and determination in the interpretation of these measures. For these reasons, the requirement that performance measures should be understandable is not included in this study's discussion of school output measures.

In order to be informative about the actions and efforts used to achieve valued objectives, performance measures should be comparable to some kind of benchmark or standard. Comparability is discussed as a requirement with regard to financial statements and implies that "measurement and display of the financial effect of like transactions and other events must be carried out in a consistent way throughout an entity and over time for that entity and in a consistent way for different entities" (IASB, 2001, p43). This implies that comparability across both organisations and time relates to whether performance measures are prepared according to the same set of objectives, criteria or rules. This essay discusses superior authorities' control of their subordinates, and it is assumed that performance measures studied are prepared according to the same procedures and rules. Therefore, comparability is not further discussed as a requirement for the performance measures used for management control. However, the performance measures might have limited comparability because of limitations with regard to the precise requirements discussed above. The methods used to make the information provided more precise, and consequently more comparable, are thus discussed, including benchmarking against organisations or organisational units with similar or equal characteristics.

Performance measures should also be timely, they should be prepared at fixed intervals and the value of the measures should be calculated against the costs of providing the information (Anthony & Young, 2003). The need for performance measures to be timely is probably more important for organisations that operate in fast-changing environments than for those working in more stable environments, but for the latter type, a certain frequency in the preparation of output and other performance measures may also be important. However, neither the preparation of

performance measures nor the cost of information provision are further discussed or used as performance measure requirements in this paper. Only the potential benefits of performance measure improvements or additional performance measures are discussed.

The use of more than one measure raises questions about the weight given to the different measures in their interpretation. If the results from an analysis of the value of and weight on a second performance measure in a multi-action, principal-agent setting (P.O. Christensen & Feltham, 2004)<sup>1</sup> are valid in a school performance setting, the weights on the different measures should reflect the importance of the output or performances focused on, the extent to which the measures reflect the actions and efforts used to achieve the performance measured and the extent that one could assume that an individual or organisation will follow their own interests rather than those of their superiors. A performance measurement system could include weights to aggregate the information provided by the measures, or those who interpret the measures could use “mental weights” based on their knowledge about the process or organisation controlled. Therefore, even if a kind of weighting is required to interpret a set of performance measures, it is difficult to claim that weights or weighted measures are a requirement for performance measures and performance control systems.

### ***Summing up***

The above discussion concludes that, in order to be useful for management control, performance measures should satisfy a set of four requirements or characteristics. The performance measures should be relevant, precise, complete and responsive. The table below provides a summary of the main characteristics of the four requirements.

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<sup>1</sup> Christensen and Feldham’s discussion is based on Feltham and Xi (1994) and Feltham and Wu (2000).

**Table 1: Requirements to effective performance measures for management control**

<b>Performance measures should be:</b>	<b>Such measures should:</b>
<b>Relevant</b>	<ul style="list-style-type: none"> <li>- be causally linked to valued organisational outcome</li> <li>- provide information about the actions and efforts performed by the individual or organisation controlled</li> <li>- or reduce noise in other performance measures</li> </ul>
<b>Precise</b>	<ul style="list-style-type: none"> <li>- Valid – measure what it is intended to measure</li> <li>- Reliable – independently verifiable, derived from known formulae and difficult to manipulate</li> </ul>
<b>Complete</b>	<ul style="list-style-type: none"> <li>- capture all <u>relevant</u> actions and efforts,</li> <li>- a set of measures should be comprehensive but parsimonious</li> </ul>
<b>Responsive</b>	<ul style="list-style-type: none"> <li>- reflect changes in the agent's actions and effort</li> <li>- measure actions and efforts controllable by the individual(s) controlled</li> <li>- be related to the responsibility of a person or an organisational unit</li> </ul>

A relevant performance measure should satisfy the complete, precise and responsive requirements for performance measures used for management control. However, a performance measure that does not completely satisfy the relevant requirement might still be valuable if more relevant measures are impossible to prepare, and relevant performance measures that are not totally precise, complete and responsive may likewise provide information of some relevance for management control if it is not possible to create more precise, complete and/or responsive measures. On the other hand, if a measure is completely irrelevant, i.e. if the measure does not provide information about the actions and efforts performed to achieve valued organisational objectives or information that may make other measures more precise, it does not matter if the actual measure is precise, complete and responsive.

## **School production and school control systems**

### ***Characteristics of professional services***

Service production differs from the production of tangible goods in several ways. Anthony and Young (2003) and Auzair and Langfield-Smith (2005) sum up the main differences as: 1) services are intangible; 2) it is difficult to measure both the quality and the quantity of services; 3) services are perishable, which implies that they cannot be stored but have to be consumed at the time that they are produced, that services not consumed are lost and that service-producing organisations do not have the possibility to use an inventory to smooth out fluctuations in demand in the way that producers of tangible goods can; 4) the quality of a service cannot be inspected in advance, but is, in best case, revealed and experienced at the moment of production and consumption;



5) the customers are involved in the production of services (the inseparability of production from consumption); 6) services provided by the same person may differ between customers at different times (the heterogeneity of service products); and 7) service production is usually labour intensive and it is difficult to replace employees with technical equipment or automated processes.

Several of these characteristics imply that output measurement and control of public services might be difficult. In addition, because public services are usually free or subsidised and are provided with no or only limited possibilities for the consumer to choose between different providers, the demand for public services provides scant information about the quality of the services provided by different producers. Several public services do have characteristics in common with professional services, characteristics that may have additional consequences in terms of the possibility to use output measures for management control purposes. One such characteristic is that professional service customers, or consumers, may be unable to judge the quality, and particularly the competence, of service professionals (Silvestro, 1999). Evaluation of the quality or at least evaluation of some of the characteristics of professional services requires professional judgement (Silvestro, 1999). In addition, professional services are characterised by only a few tangible assets, and the skills of its professional staff is an organisation's principal asset (Anthony & Govindarajan, 2001).

### ***School characteristics and school objectives***

School production fits with most of the characteristics of both services and professional services referred to above. School output is difficult to quantify and measure unambiguously (Engert, 1996) and depends on the present teachers' and other school employees' actions, efforts and abilities, as well as on the efforts and abilities of pupils, and the influences of peers, parents and others (Hanushek, 2002). In addition, school production is a cumulative process (e.g. Hanushek, 2002), there may be interdependencies in the production of the different types of school output (Engert, 1996) and there may be conflicting opinions with respect to the most valuable school objectives and school output between different school stakeholders or stakeholder groups (Engert, 1996). Other characteristics of schools are that the teachers are usually a strong professional group, whilst they also constituting a strong

school stakeholder group, and teachers are the professionals who are capable of evaluating the quality of education and school output. However, schools and school production differ from other types of professional public services in that, even if output measurement is difficult, some types of school output measures, such as test and examination results, already exist and have long traditions in schools.

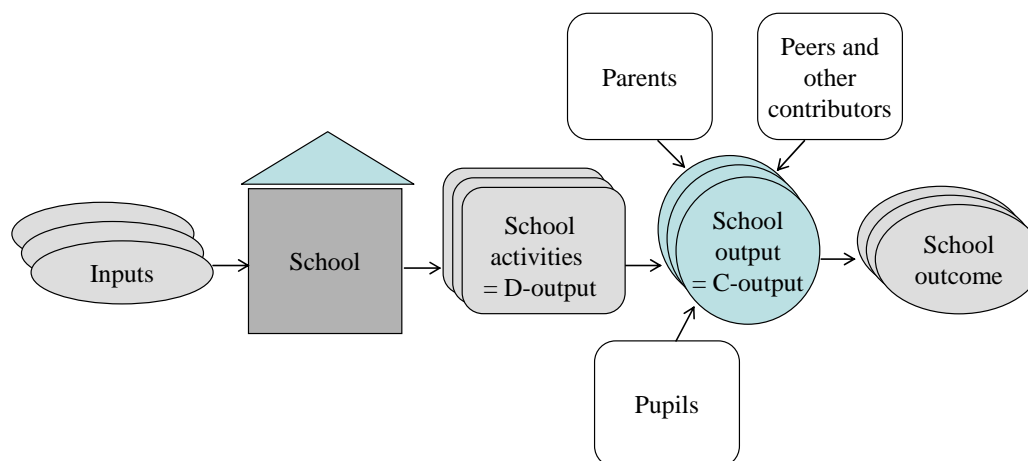
Although there may be conflicting opinions about the value of the different school objectives, it is reasonable to assume that some school objectives are considered highly valuable by most school stakeholders or that some conflicting opinions about what are the most valuable school objectives may have been solved by political decisions (Hofstede, 1981) and then stated in laws, regulations and the curriculum. Such objectives may be, for instance, that schools should contribute to the learning and upbringing of pupils (The Norwegian Education Act, 1998). Other objectives that might be highly valued by school stakeholders may relate to the well being of pupils in school and their learning environment.

### ***Types of school output***

Different opinions about valuable school output can be interpreted in at least two dimensions that are visualised in the illustration of the school production process in figure 1. This illustration is inspired by Hanushek's (2002) summary of the state of knowledge within school economics and by Bradford et al.'s (1969) discussion of public services and distinction between D- and C-output from public services.

The first possible interpretation of school output is visualised in figure 1 as the three subsequent categories of school output, in the figure called "school activities", "school output" and "school outcome". The second interpretation of school output is that schools produce different types of school activities, school output and school outcome. School stakeholders may have different opinions about which categories of school output should be focused on – school activities, school output or school outcome – as well as about the value of the different types of activities, output and outcome, which affects what activities, output and/or outcome should be measured.

**Figure 1: The school production process**



School economics research tends to focus on “school output” and “school outcome” as being the results of the school production process. School economics studies focusing on school outcome typically use the income of students in their post-school professional occupations, economic growth, or other macro-economic measures as their school outcome measures (e.g. Lewis et al., 1989; Mak, 2000; Meng, 1995). This type of output measures is also called “social indicators” (Anthony & Young, 2003), and is not further discussed in this paper.

“School output” is the other type of results from the school production process that is frequently used in school economics research. This strand of research typically uses the students’ skill level or learning as their school output measures. Students’ skill level uses to be measured by test scores (e.g. Brown & Saks, 1987), examination results (e.g. Estelle et al., 1996) or graduation rates (e.g. Dee, 1998) while students’ learning is measured as changes in the knowledge and skills of students and referred to as “value-added” school output measures (e.g. Goldhaber et al., 1999; Grosskopf & Moutray, 2001; Ladd & Walsh, 2002). Other types of valuable school output could be social and mental maturation, pupils’ well being in school and some types of theoretical knowledge and practical skills not usually measured by schools or school authorities.

Among the school objectives, there may be some for which a school’s achievements could be best evaluated by professionals. Pupils’ theoretical and practical knowledge and learning are types of school output that are traditionally evaluated by

professionals, for instance by the use of different types of tests and examinations prepared and evaluated by teachers. These kinds of school output are in the following referred to as “professionally-evaluated school output”. For other school objectives, the achievements of a school could be evaluated by the pupils, their parents or other non-professionals. Such objectives may for instance be related to issues such as the well being of pupils in schools, the absence of bullying and pupils’ satisfaction with the school facilities and the school as such. These measures are referred to in the following as “consumer-evaluated output measures”.

Difficulties with respect to the identification and measurement of output from public services encouraged Bradford, Malt and Oates (1969) to decompose this output into what they termed D-output and C-output. They defined “D-output” as “the services directly produced” and “C-output as the “thing or things of primary interest to the citizen-consumer”. Bradford et al. (1969) mentioned school lessons in different subjects and school plays as examples of school D-output, and student test scores as an example of C-output.

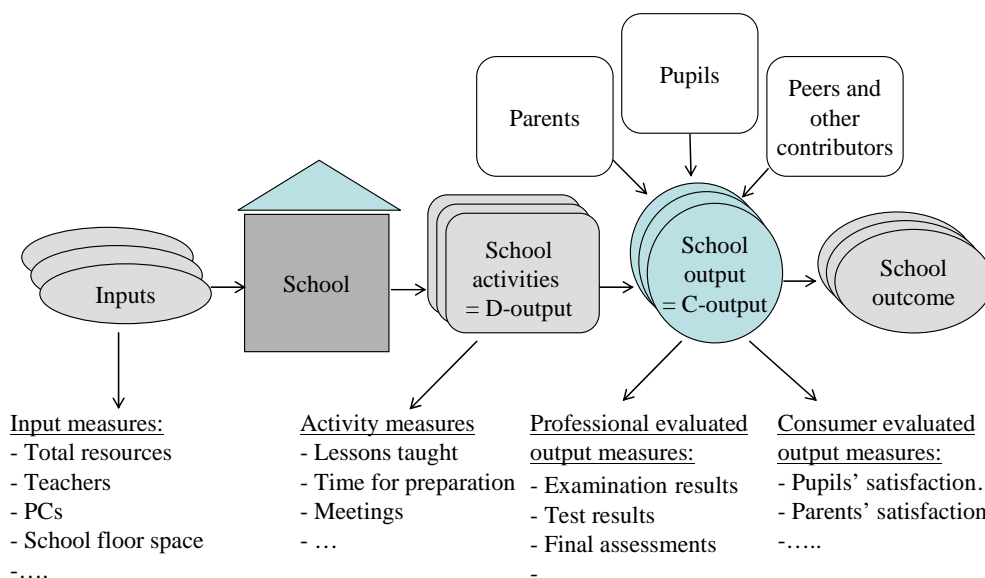
Decomposition of a production process is also known from management accounting. Activity Based Costing, ABC, is a recent method for cost measurement and management, and one of the core characteristics of ABC is the decomposition of a production process into activities. The figure above illustrates how the transformation of inputs into several types of output can be split into two processes: the use of inputs to produce different types of activities, and the use of the different activities to produce different types of output. Depending on the complexity of the production process, the transformation from input into output may be split up into a network of parallel and sequential input-output processes and activities. The decomposition of production processes into activities can facilitate efficiency evaluation and efficiency-improving decisions at the activity level, with possible consequences for overall efficiency and effectiveness as well as the evaluation of activities with regard to whether they are value adding or non-value adding.

The present paper uses the term “school output” to refer to school C-output, while the term “school activities” corresponds to school D-output. In addition, the term “activity

measures” used in this paper equates to the term “process measures” (e.g. Anthony & Young, 2003).

Although some school activities, like the number of lessons taught, could be measured and reported by pupils, their parents or other school stakeholders, it may be difficult for any of these groups who are external to a school’s everyday life to observe and measure school activities. Therefore, school activity measures are discussed as one type of school performance measure, with the result that three types of school performance measures are discussed against the requirements for performance measures used for management control outlined above. These are: professionally-evaluated school output measures, consumer-evaluated school output measures and school activity measures. The figure below illustrates the school production process with examples of school activity and output measures, and some examples of school input measures.

**Figure 2: The school production process and measures of school input, activities and output**



### ***The Norwegian national school quality control system***

In 2004 the Norwegian central school authorities implemented a nationwide public school quality control system. This system was implemented to facilitate school quality and improved learning for individual pupils<sup>2</sup> at all levels of Norwegian primary and secondary schools. The system publishes a set of school level data and

<sup>2</sup> <http://www.skoleporten.no/templates/Page.aspx?id=17014&epslanguage=NO#Bakgrunn>.

this set of data is aggregated to the municipality and national levels. Most of the data is publicly available on a website,<sup>3</sup> while some data is only available to headmasters, local school authorities, central school authorities and other authorised persons or organisations. The table below contains a list of the school data used in the Norwegian school quality control system.

**Table 2: The Norwegian national school performance measurement system<sup>4</sup>**

<b>Measures</b>	<b>Type of performance measure</b>
<b>Facts about the school:</b>	
Number of pupils	
<b>Input resources</b>	
Pupils/teacher man- year	Input
Pupils/assistant man-year	Input
Teacher hours <sup>5</sup> per pupil in total (public) and by different teaching categories (non-public)	Input
Average “teacher density” <sup>6</sup> grade 1-7 (including teaching pupils with special needs)	Input
Average “teacher density” grade 8-10 (including teaching pupils with special needs)	Input
Pupils per PC	Input
Share of PCs with internet connection	Input
<b>Learning environment</b>	
Pupils’ well-being, (total, girls, boys)	Output, consumer evaluated
Bullying (total, girls, boys)	Output, consumer evaluated
Pupils’ motivation, (total, girls, boys)	Output, consumer evaluated
Encouraging teachers, (total, girls, boys)	Output, consumer evaluated
Pupils’ working environment (total, girls, boys)	Output, consumer evaluated
Working plans and curriculum objectives (total, girls, boys)	Output, consumer evaluated
Student council (total, girls, boys)	Output, consumer evaluated
Pupils’ partaking (total, girls, boys)	Output, consumer evaluated
Physical learning environment (total, girls, boys)	Output, consumer evaluated
<b>Learning outcome</b>	
Examination marks – respectively Norwegian, English, mathematics	Output, professionally evaluated
Result, nationwide tests - respectively Norwegian, English, mathematics (non-public)	Output, professionally evaluated
Final assessments in Norwegian, English and mathematics respectively adjusted for pupils’ family background (non-public)	Output, professionally evaluated
Examination results in Norwegian, English and mathematics respectively adjusted for pupils’ family background (non-public)	Output, professionally evaluated
“Lower secondary school points” - An aggregated measure of final assessments in all subject the last semester of lower secondary school adjusted for pupils’ family background (non-public)	Output, professionally evaluated

<sup>3</sup> www.skoleporten.no.

<sup>4</sup> www.skoleporten.no.

<sup>5</sup> The number of lessons a year each teacher teach \* the number of teacher man-years.

<sup>6</sup> “Teacher density” = ((number of pupils at each grade \* lessons a year that should be taught at the same grade) summed for all grades) / ( the number of teacher hours a year).

### **School and school input data**

The Norwegian national school quality control system contains a set of input measures for each school. These are variants of teacher and assistant resources per pupil, and pupils per teacher and assistant man-labour years, as well as two measures providing information about the number of PCs available for the pupils. In addition, the system publishes the number of pupils in each school. However, the objective of the present paper is to discuss school output measurement, and school input measures and the number of pupils measure are therefore not discussed any further.

### **Consumer-evaluated school output measures**

The school output measures are of two different types. The first group is consumer-evaluated school output measures. These look at the answers of pupils to a questionnaire about their everyday school life. Every year Norwegian pupils at grades seven and ten are asked to answer a set of questions about their learning environment. The questionnaire includes questions about well being, bullying, motivation and several other issues. For most of the questions, the pupils should mark on a scale from 1 to 4 the extent to which they agree with the statements they are presented with. The measures that are presented in the Norwegian school quality control system are the pupils' average answers to the different questions. The questions are grouped according to the issues focused on, and the average of the scores within each issue category is also published.

Pupils' well being, the absence of bullying, pupils' satisfaction with their teachers, their participation in decisions and planning and other issues concerning the learning environment can be interpreted as preconditions for the learning and maturation of pupils.<sup>7</sup> However, these issues also represent valued school objectives on their own. Therefore, these measures are interpreted as school output measures and, in the following, they are referred to as "consumer-evaluated school output measures".

### **Professionally-evaluated school output measures**

The second group of school output measures relates to pupils' achievements. These measures are taken from the schools' average results from exams in Norwegian, English and Mathematics, and the average final assessments in the same subjects for

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<sup>7</sup> <http://www.skoleporten.no/templates/QualityTopicPage.aspx?id=11677&epslanguage=NO#listetopp>.

pupils leaving lower secondary schools. In addition, the professionally-evaluated school output measures also include average results from nationwide tests in these subjects, as well as three types of measures of pupils' achievements adjusted for family background. The nationwide tests are performed by pupils at grades four, seven and ten, while the measures of achievements adjusted for family background are based on examination results and final assessments in Norwegian, English and mathematics, an aggregated measure of 11 final assessments of pupils finishing lower secondary school and a set of measures of the characteristics of the pupils' family background, which includes the number of siblings, parents' education, ethnic background, family income and several other family variables (Hægeland, Kirkebøen, Raaum & Salvanes, 2005).

From the beginning of 2004, the results from the nationwide skill tests, the examination results and the final assessments were all published on the public part of the website. However, the nationwide skill tests and the publishing of the results of the tests on the web were met with resistance from school employees, pupils and some political parties. After the change of government in 2005, the nationwide skill tests were not carried out in 2006 and the results from the tests are now published only on the non-public part of the website. In addition, the measures of pupils' achievement adjusted for family background (Hægeland et al., 2005) are published in the non-public section of the website.

Examination papers and nationwide tests for Norwegian pupils are designed by professionals who are not employed in the schools that the pupils attend. Pupils' answers to the examination papers are evaluated by teachers from other schools, while their answers to the nationwide tests are evaluated by their own teachers, or by another teacher from their local school, according to rules given in the test instructions. Consequently, these types of output measure, as well as the final assessments and measures of pupils' achievements adjusted for family background are "professionally-evaluated school output measures".



### ***The local school performance control system***

Norwegian public schools are owned by the municipalities, and the local school authorities may have their own control systems for schools in addition to the national school quality control system. The local control system discussed in this paper is used in a large municipality in the Norwegian context. Some years ago the municipality implemented devolved financial management at schools alongside a control system that included a yearly contract between the headmasters and the local school authorities as well as two types of standardised report on school performances from the schools to the local school authority: a monthly accounting report and a yearly school performance report.

### **The yearly school performance report**

Local school authorities may formulate their own objectives to supplement the overall school objectives stated in the Norwegian Education Act (1998) and other regulations given by the central school authorities. In the municipality discussed in this study, local school objectives are stated in the yearly contract between the school headmasters and the local school authorities. The contract contains objectives common to all schools in the municipality as well as school-specific objectives. The objectives are formulated mainly as areas or issues that should be given particular attention over the next year. Measurable targets are not formulated for any of the objectives.

At the end of the year the headmasters have to report their actions and efforts to achieve these objectives. These are reported as a written statement for each objective. In addition, they evaluate their effort to achieve the actual objectives on a scale from one to five, where one is “not very good” and five is “extremely good”. Consequently, the measures are the headmasters’ subjective perception of their own and their school’s efforts to achieve the objectives.

The type of issues focused on in the yearly contract and the yearly local school performance report are related to the school production process and provide subjective information with regard to activities and efforts performed by schools to achieve the school objectives. The measures do not provide any information about the effects of activities and efforts on pupils’ learning or other types of school output. The table

below shows how one headmaster has reported his school's actions and efforts related to some of the local school objectives.

**Table 3: Example of annual school performance report – some common school objectives<sup>8</sup>**

Common focus areas for all schools (annual contract item 2a)	Describe important achievements that have been started concerning the sector's common focus areas (include a rough estimate of when the measures started up)	Assessment of the school/unit's efforts in 2004 – tick off the appropriate category				
		Not very good	Fairly good	Good	Very good	Extremely good
Prepare organisation of the teaching work efforts in suitable groups	The cramped school has unfortunately had restrictive effect on the flexibility. Inevitably, the groups had to be bigger than desirable. We have continued the organisation from the experimental period (bases and basis groups), in particular in the 2004 spring semester.				X	
Active efforts to improve the results in reading, writing and mathematics	Participation in courses by the local authority. Reading projects. Reading workshop. Focus on performance/presentation in connection with projects. Constructing a modern library. Carried out all-day test in mathematics, in groups, for 8 <sup>th</sup> grade. "Math Day". Competence-building for teachers in use of ICT in 2004.			X		
Active pupil participation methods and use of various learning environments	Continuation of the 3-year experiment "Hand in hand with the pupil into the future". Adjustment of the teaching model according to conclusions in the evaluation of January 2004. The school's outdoor areas, local environment included in annual schemes. Both spring and fall in 2004.				X	

### **The monthly accounting report**

The monthly accounting report from the schools to their local school authorities contains information about expenditure and income for the actual month, the budget for the actual month and budget variance for the month. In addition, the report contains the budget for the year, a prognosis for the year based on accumulated accounts and an estimated budget variance. The schools report accounting and budget numbers for 5 types of expenditure and 5 types of income.<sup>9</sup>

The numbers reported in the monthly accounting report provide information about school input and how the schools use their financial resources. The objective of the present study is to discuss school output measures and whether school output

<sup>8</sup> Tables 4 and 5 in appendix 1 show one headmaster's report with regard to local school objectives.

<sup>9</sup> An example of a monthly accounting report is presented in table 3 in appendix 1.

measurement is possible. Therefore, even if input data is necessary for efficiency evaluation, and although input measures may be used as proxies for output measures (Anthony & Young, 2003), the measures in the monthly accounting report are not further discussed in this essay.

## **School output measure evaluation**

The second objective of this study is to discuss whether school output measures satisfy the requirements for performance measures used for management control. The characteristics of schools and the school production process give reason to question whether the types of school output measures used in the Norwegian school quality control system satisfy these requirements, and consequently whether they are useful for superior authorities' control of schools' and school employees' actions and efforts to achieve valued school objectives. These questions are addressed in this section.

### ***Professionally-evaluated school output measures***

Professionally-evaluated school output measures such as final assessments, examination results, test results and similar measures of pupils' performances are frequently used in school economics research, as well as in school accountability systems such as the Norwegian school quality control system. However, do these types of school output measure provide relevant, precise, complete and responsive information about the actions and efforts of schools and their employees to achieve valued school objectives?

#### **Relevant**

Performance measures are relevant for management control if they are causally linked to valued organisational objectives and provide information about the actions and efforts of an individual or an organisation to achieve valued organisational objectives. Although there may be conflicting opinions about what are valuable school objectives and output (Engert, 1996), politically-decided school objectives stated in education acts, curriculum and other regulations are typically related to pupils' learning and maturation. Therefore, traditional professionally-evaluated measures of pupils' skills and knowledge satisfy the requirement that relevant performance measures should be

causally linked to valued organisational objectives. In addition, the above discussion of the school production process makes it reasonable to assume that schools contribute to the achievement of these objectives. Consequently, we can say that professionally-evaluated school output measures do provide at least some information about a school's actions and efforts towards achieving valued school objectives.

### **Precise**

It has been argued above that the extent to which a performance measure provides precise information about the concept or performance measured is a question of validity and reliability. Regarding the use of professionally-evaluated school output measures as signals of schools' and school employees' actions and efforts to achieve valued school objectives, the questions of validity and reliability can be sub-divided into three parts: 1) Are professionally-evaluated school output measures valid measures of pupils' skills and knowledge? 2) Are these measures reliable? And 3) are such measures of pupils' skills and knowledge valid and reliable measures of schools' and school employees' actions and efforts to achieve valued school objectives in the areas of skills and knowledge?

Whether examinations, tests and other evaluation procedures are valid instruments for testing the skills and knowledge of pupils is a question of relevance for school professionals. Therefore, this question is not further discussed in this paper.

Although tests and examinations should be valid measures of pupils' skills and knowledge, the results reported from such tests and examinations are not necessarily reliable. Rewards or punishments that are based on school output measures may tempt teachers or other school employees to manipulate the school output measures (Buss & Novick, 1980; Jacob & Levitt, 2003). In addition, professional school output measures may be unreliable due to conflicting opinions between school stakeholder groups about what are the valuable school objectives and outputs, and whether and how school output should be measured. These divergent opinions may tempt school stakeholder groups to affect or neglect school output measures and measurement procedures, thereby making the measures unreliable or unavailable for their superior authorities. The resistance against the Norwegian national tests, the boycott of the tests by pupils and teachers, the withdrawal of tests for the school year 2006 and the

decisions to discontinue publishing the previous test results on the web are examples of how strongly school stakeholder groups may affect school output measures and measurement and the reliability of such measures.

Furthermore, the characteristics of the school production process give reason to question whether professionally-evaluated school output measures provide valid information about actions and efforts of schools and their employees to achieve valued school objectives. It is reasonable to assume that these actions and efforts contribute to school output, and that some information is provided about them by professionally-evaluated school output measures. However, the fact that pupils' achievements are caused not only by the work of their present school and teachers, but are also the results of their own efforts and capabilities as well as the influences of parents, peers, previous schools, previous teachers and other externals, implies that the test scores, examination results and similar measures of pupils are at best noisy measures of the contribution of the present school and its employees to school output.

In addition, although traditional professionally-evaluated school output measures should be reliable measures of the skills and knowledge of pupils, these measures of pupils' achievements may be unreliable concerning the extent to which the actions and efforts of a schools help achieve valuable school output because of random effects. For instance, in the Norwegian school quality control system discussed above, the measures of pupils' achievements are average examination results and final assessments for pupils finishing lower secondary school (grade 10), and average test results for pupils at grades four, seven and ten. Most Norwegian schools are small, and consequently the number of pupils at each class level is limited. In the school year 2006-2007, the average Norwegian school had 193 pupils.<sup>10</sup> The average number of lower secondary pupils per school was 143, while the average number of pupils at grades one to seven was 159, or about 23 pupils at each grade. Children have different abilities and aptitudes. Some of these differences might be related to family background, while other are caused by physical or mental disabilities or by other factors. Independent of abilities and aptitude, Norwegian children normally attend their local school. In light of the limited number of pupils at each grade level in

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<sup>10</sup> [www.ssb.no/kostra](http://www.ssb.no/kostra).

Norwegian schools, it is reasonable to assume that the distribution of pupils with respect to abilities and aptitude in each grade is neither equal in all schools, nor equal at the same grade level from one year to the next in the same school. Different groups of pupils may require different actions and efforts performed by the same schools to achieve an equal level of knowledge and skills. Therefore, even if family background and the other influences discussed above were considered to be equal for all schools, and assuming that abilities and aptitude are important determinants of a pupil's school achievements, traditional school output measures should be considered unreliable measures of schools' and school employees' actions and efforts to achieve to achieve valued school objectives. Consequently, it is reasonable to assume that professionally-evaluated school output measures have limitations with regard to the precise requirement.

### **Complete**

School output might be difficult to quantify and measure unambiguously (Engert, 1996). Therefore, it may also be difficult or impossible to develop one complete school output measure. In addition, even if the most valued school objectives are politically decided (Hofstede, 1981) and the most valued school output should be possible to measure, it might be difficult to aggregate the different forms of output into one complete school output measure. To develop a set of school output measures that together capture all the actions and efforts performed by a school to achieve the valued objectives seems to be an easier option, but may still prove to be difficult. However, school production is characterised by interdependencies in the production process, in that improved skills in one area may lead to improved skills in other areas (Engert, 1996). Therefore, it is possible that assessments of measurable types of school output are also useful for immeasurable types of school output, and thereby informative about actions and efforts to provide immeasurable types of school output. If this is the case, it is reasonable to assume that professionally-evaluated school output measures may be signals of the practical and theoretical achievements of pupils that are not measured, and possibly also signals of school output such as pupils' moral, social and mental maturation. Consequently, professionally-evaluated school output measures may be more complete than they may seem at first sight.

Even if assessments of measurable types of school output may be informative about immeasurable types, if these are restricted to only some types of school output they may result in dysfunctional behaviour. Too much focus on some school output measures may lead to actions and efforts dedicated to these types of output, and consequently to little being done to achieve valued but unmeasured types of school output (e.g. Rapple, 1992). This tendency may occur in situations where financial reward or punishment is coupled to the output measures (e.g. Rapple, 1992); however, based on an assumption of “what is measured is managed”, it is reasonable to state that incomplete measures without couplings to financial reward or punishment may also lead to dysfunctional behaviour. Consequently, a set of measures of pupils’ achievements in a limited range of subjects has limitations with respect to the complete requirement.

The traditional professionally-evaluated school output measures used in the Norwegian school quality control system assess pupils’ achievements in some subjects at some grade levels. Even if these measures might possibly be signals of unmeasured output and achievements in other grades or subjects, it is also possible that they may cause dysfunctional behaviour. Therefore, it is reasonable to conclude that the types of traditional school output measure used in the Norwegian school quality control system have limitations with respect to the complete requirement.

### **Responsive**

In general it is difficult to conclude whether professionally-evaluated school output measures are responsive to changes in the actions and efforts of schools and their employees. Research on the school production process have found ambiguous results concerning the extent to which teacher and school characteristics affect school output (e.g. Hanushek, 2002), and the fact that school output is influenced by the pupil’s own efforts and abilities, the influences of prior schools, teachers and peers, as well as by other external influences, implies that changes in school output measures are not necessarily signals of changes by a schools and its employees. In addition, there is at least the theoretical possibility that the responsiveness of school output measures to changes in schools’ and school employees’ actions and efforts may be limited due to a substitution effect between the contribution of teachers and that of parents or other external parties to school output. For instance, if a teacher’s performance is poor, their

pupils and/or the parents might compensate for this poor performance, at least to a certain extent. The pupils might use more time for homework and parents may give their children more help. If the teacher performs excellently, the parents may reduce this type of contribution to their child's learning and the pupils may also use less time for their homework.

On the other hand, it is difficult to claim that traditional school output measures are not responsive to changes by schools and school employees. Therefore, although the behaviours of others may influence the measures, it is reasonable to assume that this type of school output measure is responsive. However, it might be difficult or even impossible to decide whether changes in this type of measure are actually caused by changes in the actions and efforts of a school and its employees.

### **Summing up**

Traditional professional school output measures are relevant, but these measures have limitations with regard to the precise and complete requirements for performance measures used for management control. In addition, although it is reasonable to assume that this type of measure is responsive to changes in a school's actions and efforts, the measures are equally responsive to the influence of others.

### ***Professionally-evaluated school output measures adjusted for the family background of pupils***

Traditionally, school economics researchers have used statistical methods to separate the effects of a school's contribution to school output from those of pupils, families and other external parties in estimations of school production functions (e.g. Hanushek, 2002). The measures of pupils' achievements adjusted for family background in the Norwegian school quality control system are in line with this tradition (Hægeland et al., 2005).

It is reasonable to believe that this adjustment may result in measures providing more precise information about the effectiveness of a school's actions and efforts to achieve school objectives with regard to pupils' learning, and that changes in the measures would be caused to a larger extent by changes in these actions and efforts. The



measures of pupils' achievements are adjusted for a kind of average effect of socio-economic variables, and the socio-economic variables used in the estimations are proxies for the contribution of parents and others to school output. In addition, the effects of the influence of prior schools and teachers to present school output measures are not controlled for, and the measures are exposed to the same random effects as the unadjusted measures. Therefore, even if professionally-evaluated school output measures adjusted for family background are probably more precise than unadjusted measures, it would seem that they still have limitations with respect to the precise requirement. In addition, the limitations with respect to the complete and responsive requirements would seem to be similar as for unadjusted professionally-evaluated school output measures.

### ***Consumer-evaluated performance measures***

The Norwegian national school quality control system contains examples of consumer-evaluated school output measures. These are based on the answers given by pupils to a questionnaire, but other types of measures or indicators, as well as other groups of respondents, may be possible. The questions of interest for this essay are whether and to what extent consumer-evaluated school output measures provide relevant, precise, complete and responsive information for management control of schools; and whether this type of measure contributes to the professionally-evaluated school output measures with respect to information matching these requirements about schools' and school employees' actions and efforts to achieve valued school objectives.

#### **Relevant**

While it is reasonable to assume that measures of the learning or skill level of a pupils' are causally linked to valued school objectives, it is more difficult to state that consumer-evaluated school output measures are likewise causally linked to objectives and reflect the work undertaken by a school to achieve the objectives. However, performance control systems may be used not only for scorekeeping, but also for strategy communication and attention-directing purposes (e.g. Horngren et al., 2003; Kaplan & Norton, 1996). Assuming that this is the case for the Norwegian school quality control system, we can say that measures based on pupils' answers to

questions about their learning environment and well being in school reflect the school objectives that are valued by Norwegian school authorities. In addition, assuming that teachers and other school employees are able to affect the learning environments and well being of pupils at school, consumer-evaluated school output measures might provide valuable information about the efforts of a school and its employees to create a good learning environment and a sense of well being. Consequently, these are relevant school output measures.

### **Precise**

Whether questionnaires or other instruments used to provide information about the satisfaction of consumers with public services provide valid information is not a question of interest for this study. In the following, it is simply assumed that consumer-evaluated school output measures are valid regarding the opinions of pupils or others with respect to the issues focused on and, consequently, that the consumer-evaluated school output measures in the Norwegian school quality control system reflect pupils' satisfaction with and opinions about the issues questioned. The pertinent interesting questions are whether consumer-evaluated school output measures are valid measures of the actions and efforts of schools and their employees to achieve valued school objectives, and whether the measures are reliable.

It is reasonable to assume that the actions, efforts and behaviours of schools as organisations, as well as their teachers and other employees, influence a pupil's well being in school and their satisfaction with their school and learning environments, and consequently that consumer-evaluated school output measures provide some information about how these actions and efforts help achieve valued school objectives with respect to these elements. Research on citizen satisfaction measures has found no relationship between consumer satisfaction measures and administrative service quality measures (Higgins, 2005; Kelly, 2003), nor any clear relationship between perceived levels of service quality and satisfaction with the services (Roch & Poister, 2006). In addition, researchers have found that satisfaction is influenced more by expectations of service quality rather than by the actual service quality (Roch & Poister, 2006). If these results apply to consumer-evaluated school output measures, it is reasonable to question whether such measures are valid for the contribution of schools and their employees to the satisfaction of pupils with their learning

environments and their well being in school. It is also likely that at least some characteristics of a pupil's learning environment will be influenced by external contributions and by the pupil's own efforts, actions and attitudes, and that these factors may reduce the validity of consumer-evaluated school output measures with respect to pupils well being, bullying and other consumer-evaluated school characteristics. Consequently, they are at best noisy measures of schools' and school employees' actions and efforts to achieve valued school objectives regarding the satisfaction of pupils with their learning environments and well being in school.

In terms of the reliability of the measures, it would appear that consumer-evaluated school output measures would be exposed to similar types of manipulation to professionally-evaluated school output measures. Consequently, we can say that consumer-evaluated school output measures have limitations with regard to validity and reliability, and thus with regard to the precise requirement for performance measures used for management control.

### **Complete**

Quality evaluation of professional services, or at least the evaluation of some qualities of professional services, requires professional judgement (Silvestro, 1999). For this reason, consumer-evaluated school output measures could hardly be seen as complete measures of school output. However, such measures may, together with professionally-evaluated school output measures of pupils' skill level or learning, provide more complete information about the actions and efforts of schools and their employees to achieve valuable school objectives than professionally-evaluated school performance measures would alone.

### **Responsive**

As for the discussion of reliability, it is difficult to conclude that consumer-evaluated school output measures either are responsive or unresponsive in general. The research on the relationship between service quality and citizens' satisfaction with the public services referred to above (Higgins, 2005; Kelly, 2003; Roch & Poister, 2006) raises the question whether consumer-evaluated school output measures could be responsive to changes in the actions and efforts of schools to achieve valued school objectives. On the other hand, pupils' satisfaction with their learning environments and well

being in schools is clearly influenced by the behaviour and decisions of their teachers and other school employees. Therefore, it is reasonable to assume that consumer-evaluated school output measures are responsive, just as professionally-evaluated school output measures are, but that the measures may also be responsive to other factors and behaviours.

### **Summing up**

As with professionally-evaluated school output measures, consumer-evaluated school output measures are relevant but have limitations with respect to the precise and complete requirements. In addition, although they may be responsive to changes in schools and school employees' actions and efforts, this also applies to changes in other factors and behaviours.

### ***Summing up***

The above discussion shows that the three types of school output measures discussed are relevant, but all have limitations with regard to the precise and complete requirements. In addition, although we can say that these types of school output measures are responsive to changes made by schools and school employees, this is also true for changes in other factors and behaviours. If professionally-evaluated school output measures have been adjusted for the pupils' family background, they still have limitations with regard to the precise and complete requirements, but are probably more precise measures of the contributions of schools and their employees to the achievement of their superior objectives than those that are unadjusted. A set of both consumer-evaluated and traditional and/or adjusted professionally-evaluated school output measures might increase the completeness of the information provided, and possibly also provide more precise information about what is being done to achieve objectives valued by their superior authorities. However, the information provided by the set of school output measures still retains limitations with regard to the precise and complete requirements and still suffers from limitations with regard to the responsive requirement.

## **Possible school output measure improvements**

The main reasons for the limitations in the types of school output measures discussed in the last section regarding the precise and complete requirements are that they are influenced by recent and previous behaviours other than the actions and efforts of the actual schools and its employees, and that only some types of valued school output are measured. Therefore, it is interesting to discuss whether other types of school output measures or the way the measures are used might reduce noise in the output measures, and whether other types might contribute to more complete information about the efforts made by schools and school employees to achieve valued school objectives. Improvements to and use of the types of school output measures discussed in the last section are addressed in this section, while additional school performance measures are discussed in the next section.

### ***Value-added school output measures***

The types of professionally-evaluated school output measures used in traditional school economics analyses, as well as in the Norwegian school quality control system, are measures of the knowledge or skill level of pupils at a specific point in time. Such measures capture the cumulative effects of prior and present work of schools and teachers, of pupil's own efforts and abilities and of the influences of parents and other external parties (Hanushek, 2002). By the use of "value-added" school output measures (e.g. Ladd & Walsh, 2002), which are measures of pupils' learning rather than of the level of knowledge and skills at one point in time, the effects of prior schools' contribution to present school output and those of the influence of the pupil's prior efforts, parents and other factors are controlled for. In addition, value-added school output measures might reduce at least some of the noise caused by the unequal distribution of pupils' abilities and aptitude across schools. Therefore, it is reasonable to assume that value-added school output measures might be more precise measures of schools' and school employees' actions and efforts to achieve valued school objectives than traditional professionally-evaluated school output measures.

It is reasonable to assume that a pupil's family background not only affects their level of skills and knowledge, but might also affect their learning. Consequently, it is

reasonable to expect that value-added school output measures adjusted for family background might be even more precise than both unadjusted measures of this kind, and traditional professionally-evaluated school output measures that have been adjusted for family background.

Neither of these two types of measures is used in the two school control systems discussed in this paper. However, if the nationwide tests are carried out each year for pupils in grades four, seven and ten, it may be possible to construct value-added, professionally-evaluated school output measures and/or carry out analyses of the contribution of schools to a pupil's learning rather than to their knowledge after a few years (e.g. Hægeland, Raaum, & Kirkebøen, 2006). Analyses of Norwegian upper secondary school data indicate that pupils' prior performance is an important explanatory variable for the variation in performances, but when family background is included as a factor in the analyses, the results are not noticeably improved (Hægeland et al., 2006). Value-added school output measures taking family background into account would be adjusted by the average effect of a pupil's family background, and the variables used are proxies of the influences of the family and others parties on the individual pupil's achievements.

Consequently, value-added school output measures are probably more precise concerning the actions and efforts of schools and their employees to improve pupils' learning than non-value adding, professionally-evaluated school output measures. However, the adjustment of these measures for family background may not further improve the precision of the measures. In addition, value-added, professionally-evaluated school output measures have the same limitations with respect to the complete requirement as traditional measures.

It has been argued above that traditional professional school output measures are responsive to changes made by schools, but that the limitations with respect to the precise requirement make it difficult or impossible to decide whether changes in the measures are caused by the actions and efforts of schools and their employees. Value-added, professionally-evaluated school output measures are also responsive, and because this type of measure are probably more precise, it is reasonable to assume that

changes seen in the measures reflect to a larger degree changes in these actions and efforts.

There is little reason to assume that consumer-evaluated school output measures of the type used in the Norwegian school quality control system are influenced by cumulative effects like those faced by traditional professionally-evaluated school output measures. Even if measures such as the satisfaction of pupils with the school building might be affected by the schools' or local school authorities' maintenance in previous years, it would seem logical that the quality of pupils' learning environments and their well being in school are mostly dependent on the school's recent actions and efforts. Consequently, value-adding variants of the consumer-evaluated school output measures used in the Norwegian school output control system will probably not increase either the reliability or the responsiveness of this type of measure.

### ***Consumer-evaluated school output measures adjusted for pupils' family background***

The Norwegian school quality control system discussed in this paper does not contain consumer-evaluated school output measures adjusted for family background. However, pupils' learning environment and their well being in schools, as well as their satisfaction with their learning environments and opinion of their well being in school, may well be influenced by whether and how parents and other external parties contribute to and/or are involved in the school's daily life. Consequently, it would seem that adjusting consumer-evaluated school output measures for family background may make this type of measure more precise, and possibly also more responsive, concerning the contribution of schools and their employees to the learning environment and well being of pupils.

### ***Benchmarking against schools with similar characteristics***

It has been argued above that professionally-evaluated school output measures are noisy measures of the actions and effort of schools and school employees. In addition to factors that are controllable by school managers and employees, school output might also be influenced by the contributions of pupils, parents, peers and others to

school output, as well as by the level of school resources (input) and school characteristics such as the number of pupils, pupils' family background, class size and by other factors that are not controllable or difficult to control by schools (Hanushek, 2002).

Benchmarking a school's performances against the performances of peer schools having the same characteristics with respect to factors influencing school output but that are not controllable by the individual school, against standards estimated on a sample of schools with the same characteristics, against the school's prior performances under the same conditions with respect to uncontrollable factors or against standards based on the same assumptions with respect to the uncontrollable factors might provide more precise information about an individual school's performances than if performances are benchmarked against random schools or standards. In addition, it is likely that the responsiveness would be improved as well. However, random differences caused by the distribution of pupils with different abilities and aptitudes between schools might still cause limitations with respect to the precise and responsive requirements.

For professionally-evaluated school output measures, there exist a considerable body of research on the factors and characteristics of schools and pupils that might make this type of measure more precise (e.g. Hanushek, 2002). Similar knowledge with regard to the factors or characteristics that might cause noise in consumer-evaluated school output measures regarding schools' actions and efforts to achieve school objectives do not exist. Therefore, it is difficult to mention characteristics that may make benchmarking of consumer-evaluated school output measures against peers or standards providing more precise and consequently more responsive information.

### ***Summing up***

Value-added, professionally-evaluated school output measures adjusted for family background combined with consumer-evaluated school output measures similarly adjusted might together provide more precise measures of the contribution of schools to a pupil's learning and well being in schools than either traditional professionally-evaluated school output measures or simple consumer-evaluated school output



measures. In addition, benchmarking a school against other schools with similar characteristics might provide more precise information about their performances than benchmarking them against a random sample of schools. Neither valued-added, professionally-evaluated school output measures nor consumer-evaluated school output measures adjusted for pupils' family background are currently included in the Norwegian school quality control system, and the publishing of the school data on the web is not organised in a way that facilitates benchmarking against schools with similar characteristics. Even if these possible improvements were carried out and the data organised to facilitate such benchmarking, the above discussion make it reasonable to assume that the resulting school control system would still have limitations with respect to the precise requirement, the measures will still retain limitations with regard to the complete requirement and it will still be difficult to decide the extent to which changes in the measures are caused by changes in schools' and school employees' actions and efforts.

## **Additional school performance measures**

The above discussion of school output measures concludes that, because school production is a cumulative process and because the pupils themselves, peers, parents and others also contribute to school output, these types of measures have limitations with respect to provision of precise and complete information about the contribution of schools to a pupil's performances and well being. Although school output measures are responsive to changes in the actions and efforts of schools, these characteristics of the school production process make it difficult or impossible to decide whether the changes in the measures are actually caused by actions taken by the school and its employees. Even if value-added output measures and/or output measures adjusted for family background may well be more precise than traditional school output measures, these types of school performance measurement are still influenced by other factors and behaviours than simply the actions and efforts performed by a school. Consequently, there are reasons to search for additional types of school performance measures that might provide more precise and complete information about schools' and school employees' actions and efforts to achieve valued school objectives.

The discussion of the school production process and types of school output proposed a decomposition of the school production process into two sequential processes: the transformation of school input resources to school activities, and the transformation from school activities to school output. School economics research has studied whether and how characteristics of schools and teachers affect school output, for instance how and whether school size (e.g. Barnett et al., 2002; Kuziemko, 2006; Lamdin, 1995), class size (e.g. Cooper & Cohn, 1997; Correa, 1993), the allocation of teacher time between different teaching activities (e.g. Brown & Saks, 1987; Monk, 1984), different teaching methods (e.g. Rice et al., 2002), the number of teachers relative to the number of pupils (e.g. Stern, 1989) and a teacher's education, experience, sex, wage level and wage systems (e.g. Cooper & Cohn, 1997; Southwick & Gill, 1997; Stern, 1989) affect school output. However, although some studies discuss school activities (e.g. Duncombe et al., 1995; Millot & Lane, 2002), little attention has been paid to the volume of school activities in school economics research on the school production process, school productivity and school reforms, nor has this been addressed in management accounting studies on schools and school-related issues (cf. essay 1). Therefore, it is interesting to discuss whether school activity measures might provide relevant, complete, reliable and responsive information about schools' and school employees' actions and efforts to achieve valued school objectives, and whether and how school activity measures might contribute to the information provided by the types of school output measures discussed above.

### ***School activity measures***

The yearly report from schools to their local school authorities referred to in section four contains one kind of subjective school activity measure. Examples of school activity measures which could be assessed in numerical terms according to more objective criteria could be the time used for teaching and learning activities (Millot & Lane, 2002), the number of school lessons in different subjects and pupil-days (Bradford et al., 1969).

## **Relevant**

School activities of the same type might differ with respect to quality, and it is argued that school activity measures should not be used in analyses of school production because it is difficult to measure whether school activities are of equal quality (Duncombe et al., 1995). However, assuming that school activities have a positive effect on school output, despite the fact that quality might differ, that more school activities are better than fewer, i.e. that the marginal product of the volume of school activities is positive, and that school activity measures are causally linked to valued school objectives, it is reasonable to state that school activity measures provide relevant information about the actions performed to achieve these objectives. In addition, measures providing information about non-value-adding activities, activities not contributing to valued school outcomes or those with a contribution valued as less than the costs, might also be relevant. Such measures might facilitate activity-based management (Brimson & Antos, 1994), for instance by providing information that may help school managers reduce non-value-adding activities in favour of others with larger contributions to school output. Consequently, it is reasonable to assume that school activity measures are relevant school performance measures.

## **Precise**

It is important to consider whether measures of activities performed by school employees are valid measures of the volume of actions of schools and their employees to provide valued school objectives. However, this type of measure has limitations with regard to the quality of the activities, for instance the extent to which school employees' put effort into their activities.

The yearly report from schools to the local school authorities referred to above contains one kind of subjective school activity measure. Because the individual headmasters are asked to mark on a scale from 1 to 5 their efforts to achieve the different objectives, the measures are subjective and an equal effort might be measured differently by the different headmasters. Consequently, this type of activity measure has limitations with respect to the reliable criterion and should not be used for benchmarking across schools or to compare the same headmaster's answers related to the same objectives in different years.

However, school activity measures might be possible to prepare according to more objective criteria. Examples of such measures are the number of lessons taught and the number of, or time used for, meetings with parents. This type of school activity measure is referred to in the following as objective school activity measures.

Compared to the types of school output measures discussed above, objective activity measures are probably more valid measures of the volume of schools' and school employees' actions to achieve valued school objectives. However, the measures do not provide information about the quality of the services.

Compared to professionally-evaluated school output measures, objective school activity measures are not biased by the random effects of the distribution of pupils between schools and grade levels. Therefore, objective school activity measures provide more reliable information about the volume of the individual school's actions and efforts to achieve valued school objectives than the type of subjective school activity measure used in the local school control system and the school output measures discussed above. However, objective school activity measures might be exposed to manipulation by teachers and other school employees in a similar way as the traditional school output measures (e.g. Buss & Novick, 1980; Jacob & Levitt, 2003).

### **Complete**

It may be impossible to develop one complete school activity measure, and it may be challenging to develop a set of school activity measures that capture all the actions and efforts of schools and their employees to achieve valued school objectives. On the other hand, measures of the main school activities such as the number of lessons taught, the time used for preparation and follow up work, the number of or time used in meetings with parents and similar measures might together provide nearly complete information about the volume of actions and efforts performed by school employees. As mentioned above, school activity measures have limitations with respect to the quality of the activities performed. Therefore, even if it may be possible to measure the volume of all school activities, these measures will retain limitations with respect to the complete requirement.

## **Responsive**

If school output measures are objective and measure or count the volume of activities performed by schools and school employees, one may assume that such measures are more responsive to changes in actions to achieve valued school objectives than school output measures. It is uncertain whether activity measures of the subjective type used in the local school performance control system are responsive. As for the lack of a clear relationship between user satisfaction measures and administrative service quality measures (Higgins, 2005; Kelly, 2003), it is reasonable to assume that there will be difficulties in identifying a clear relationship between subjective activity measures and the actions and efforts performed.

## **Summing up**

Compared to the types of school output measures discussed above, it would seem that it is possible to design a set of objective school activity measures that are valid and satisfy the complete and responsive requirements with regard to the volume of school activities. However, school activity measures, like school output measures, might be exposed to manipulation. Therefore, the measures would still have limitations with regard to the reliable requirement. In addition, the quality of school activities is not reflected in school activity measures.

Even if school output measures have limitations with respect to the requirements for performance measures used for management control, the quality of the actions and efforts of schools and school employees may to some extent be reflected in school output measures, especially in those that are adjusted for family background and “value-added” measures. Therefore, the control of schools’ and school employees’ actions and efforts to achieve valued school objectives should not be a question of either school activity measures or school output measures. A set of both school activity volume measures and school output measures would provide school authorities with more precise and complete information about the level of and changes undertaken by a school than only one type of measures.

The above conclusion with regard to objective school activity measures, combined with the fact that little attention has been paid to school activity measures, raises several questions that are discussed in the following sections. The first set of these

questions is why so little attention has been paid to school activities and school activity measures by school economics researchers and management accounting research on schools, and why objective school activity measures are not used in the school output control systems discussed above. The answers to these questions might have implications for the choice, as well as for the implementations of, school activity measures in school control systems. The second set of questions relate to the design and use of school activity measures, and question how management accounting could contribute to the identification of school activities and to the design and choice of school activity measures for management control, and also whether and how school activity measures could be used for other purposes.

### ***Why has such limited attention been paid to school activities?***

The first question raised in light of the above discussion of school output and activity measures is why so little attention has been paid to school activities and school activity measures by school economics researchers, as well as in management accounting research on schools.

One possible explanation is related to the opinion that school activities should have the same level of quality to be measured, and since “it is extraordinarily difficult to measure outputs which represent quantities of activities of equivalent quality (e.g., classrooms hours at a given level of instruction)” (Duncombe et al., 1995, p266), school activity measures are considered uninteresting. However, the discussion above indicates that volume of activities may provide some valid information about the actions and efforts of schools and school employees, information that may be useful for the evaluation of school efficiency by higher authorities.

Another possible explanation may be that there is an assumption of a direct and efficient relationship between school input and school output, and that school activity measures are therefore unnecessary and do not provide any additional information to that provided by school input and output measures. However, inefficiency or slack in production processes and organisations is studied and discussed by both economists and management accountants (e.g. Leibenstein, 1966, 1975; Lukka, 1988), and there is no reason to assume that inefficiency is not an issue in schools. In addition, Millot

and Lane's (2002) discussion of the time used for teaching and learning activities compared to the time available for such activities, as well as media reports on lessons not taught and waste of time in education,<sup>11</sup> indicate school inefficiently.

A third possible explanation is that the limited focus on school activities is a result of theoretical and empirical traditions. Within school economics there is a strong tradition for the use of school output measures as pupils' test scores, examination results, final assessments and similar school output measures in the empirical analyses, and there is at least a theoretical possibility that this apparently strong tradition makes it difficult to perform and publish articles with alternative school output measures like school activity measures. However, the widespread use of school output data in school economics analyses may also be the result of a lack of other types of school data. Studies of the school production process, school costs, school productivity and the effects of reforms usually analyse data gathered for other purposes than the actual study (e.g. essay 1). Therefore, it is possible that school activity data is not used in this type of research because it is not gathered by either school authorities or by other organisations. However, this assumed lack of archival school activity data gives rise to a new question: why do central school authorities, or other organisations, not collect school activity data?

Again, one possible explanation is that such data is uninteresting and/or irrelevant, incomplete, unreliable and unresponsive. However, resistance from strong school stakeholders or stakeholder groups is another possible answer. It has been mentioned that there may be conflicting opinions between school stakeholders with respect to the valued school objectives and output (Engert, 1996), and examples of resistance by school employees against school output measurement, such as the Norwegian national skill tests, has been mentioned as well. Teachers are a large group of school employees and a strong professional group in schools, and both teachers and the teachers' labour union might be able to influence school decisions and the effects of school decisions or reforms (e.g. Broadbent & Laughlin, 1998; Edwards et al., 2000; Falch & Rattsø, 1996; Pritchett & Filmer, 1999). Therefore, it is reasonable to assume

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<sup>11</sup> E.g. Aftenposten, 07.01.24, 07.06.22, 07.11.21 and 07.11.22.

that teachers may have the strength to affect whether and how school activities and other school performances should be measured.

The presence of school activity measures in the yearly report from schools to their local school authorities may contradict this possible explanation, but may also support it. It is possible that this subjective type of activity measure is the most appropriate in light of the objectives stated in the yearly contract. On the other hand, it is also possible that these measures represent what has been possible to achieve with respect to school activity measurement following discussions with the headmasters and the Union of Education Norway's representatives. Traditionally, school activity measures from Norwegian schools have not been collected by the central school authorities or by local school authorities. Therefore, the presence of subjective school activity measures in the recently-implemented yearly report from school headmasters to their local school authorities may be interpreted as a first step towards a larger focus on "services actually provided", school activities, in Norwegian school control systems.

### ***Design, implementation and use of school activity measures***

It has been mentioned that there could be conflicting opinions between school stakeholders with regard to the valuable school objectives and output (Engert, 1996), and that these may be solved by political decisions (Hofstede, 1981). Consequently, school activity measures used for management control of schools should provide information about the actions of schools and their employees to achieve these politically-decided objectives.

However, public school performance control systems such as the Norwegian school quality control system might be constructed and implemented to serve other or additional purposes, and might include measures of interest for different stakeholders or stakeholder groups as well. School performance measures of different types might for instance provide information of relevance for parents in choosing a school (either their local school authority has introduced free school choice or the choice is an element in a residential decision), for teachers with regard to employment decisions, as well as for different school stakeholder groups with regard to political commitment and voting on local and central ballots. When used for these types of purposes, school



performance measures provide information “functioning as ‘prices’ in political markets, in much the same way as prices do in input and product markets” (Johnsen, 2005, p14).

### **Identification and choice of school activity measures**

The ABC approach, alongside Bradford et al.’s (1969) distinction between C-output and D-output, has inspired the distinction between school output and school activities in the discussion of the school production process above. The ABC approach might be a possible framework for the identification of school activities and how the different activities relate to each other. However, even if it may be possible to identify and measure all school activities, it is reasonable to ask whether all school activities should be included in a school performance control system, and at what level of aggregation the measures should be prepared. The ABC approach does not provide direct answers to these questions.

One of the above requirements for performance measures used for management control is that a measure or a set of measures should be complete in order to avoid dysfunctional behaviour. It has been argued above that a school activity measurement approach may make it possible to measure all, or close to all, school activities in volume, although not with regard to quality. On the other hand, approaches to performance management, such as the balanced scorecard, propose that a set of performance measures should measure factors or behaviours of strategic importance, rather than all the factors and behaviours involved in the organisation (Kaplan & Norton, 1996). With regard to school performance control systems, this may imply that a set of school activity measures should be complete with regard to activities of strategic importance for the achievement of valuable school objectives.

School activities might be regarded differently by various school stakeholders, and therefore different school stakeholders or stakeholder groups might have different opinions with regard to what school activity measures should be included in a school performance control system. If the school output control system should not only serve the school authority’s control of schools but also other school stakeholders’ demands for information about a school’s performances, the choice of school activity measures and level of aggregation should take into account how the different school

stakeholders value the different school activities. In order to identify school activities that are interesting for the different school stakeholders and to decide what measures of school output and school characteristics should be included in a school output control system, the value creation model (McNair et al., 2001), which is an approach to identify the value of product characteristics relative to the cost of their provision, might be a possible and interesting approach.

### **Implementation of school activity measures**

The above discussion of school performance measures presupposes a coupling between objectives and performance indicators, PIs, in a management control system. However, research on the implementation of performance indicators in order to affect practice proposes that decoupling between objectives and performance indicators might be wiser in the implementation process (Johnsen, 1999), and that decoupling between objectives and performance measures in the implementation mode might “provide management with buffers from the political process or formulating organizational objectives and from resistance allowing the organization to measure performance, experiment with PIs, and then take satisfactory PIs into use over time to facilitate organizational learning and enhance efficiency, effectiveness and equity” (Johnsen, 1999, p54). If these propositions apply to school performance control systems, it might be wise to introduce school activity measures and measurement in incremental steps, possibly combined with measures of interest for different school stakeholder groups, and to adjust the types of measures included in the system over the course of time.

The local school output control system discussed above might be interpreted as an experimental step-by-step approach towards satisfactory school activity measurement and control, an approach which might buffer resistance from strong school stakeholders and be useful for controlling the power of meanings, resources, decisions and the organisation (Hardy, 1996) in the implementation process.

### **School activity measures and school management**

In recent years, international comparisons of pupils' performances have shown that Norwegian pupils achieve low scores in subjects such as reading and mathematics, despite the fact that comparatively large resources are spent in Norwegian schools

(OECD, 2007, 2004). In addition, pupils and parents have paid increasing attention to whether schools provide the services expected, for instance whether the pupils are taught the lessons a year they should be.<sup>12</sup> Poor performances of pupils, as well as the recent focus on school activities performed by schools, indicate that Norwegian schools suffer from inefficiency and that a stronger focus on school activity control by school authorities as well as on school activities and school activity management on the school level is required.

Compared to the types of school output measures discussed in this essay, school activity measures provide more precise and complete information about the volume of activities provided by schools and school employees. Combined with information about activity costs, the volume of input resources spent on the different activities, or total costs and total resources used, school activity measures might facilitate the evaluation of school efficiency by superior school authorities in general, as well as an efficiency evaluation of the individual school. The information provided by school activity measures with regard to school efficiency, school activities and the composition of school activities might be useful for policy decisions, for instance with regard to considering implementation of regulations or incentives to encourage some types of school activities at the expense of other types of school activities.

Normally schools are familiar with time scheduling, and this might be interpreted as a kind of activity budgeting. In addition, Norwegian schools have to prepare and report how they plan to use their teacher resources, measured as “teacher hours”, on lessons and other activities for the actual school year for their superior authorities.<sup>13</sup> However, there is no control over whether the teacher hours are used in accordance with the reported numbers by superior school authorities, and it is uncertain whether the school resources are actually used in accordance with the reported numbers on the school level.

If superior school authorities implement school activity measures in their school performance control system, school activity measurement on the school level is required. If school activities are reliably measured, the measurement procedures and

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<sup>12</sup> E.g. Aftenposten, 07.01.24, 07.06.22 and 07.11.21.

<sup>13</sup> [www.wis.no/gsi](http://www.wis.no/gsi).

the school activity measures might provide school headmasters with information that could be useful for internal efficiency evaluation and decisions, and it is possible that school activity measurement over the course of time would encourage school activity management (e.g. Brimson & Antos, 1994) on the school level as well. A larger focus on school activities might also facilitate activity-value evaluation and value-based activity management, for instance as inspired by the value creation model (McNair et al., 2001), at the school level.

## **Conclusions and proposals for future research**

In recent years, Norwegian schools have been exposed to an increased focus on school output control, and both national and local school authorities have implemented school output control systems. Compared to other types of professional public services, education has a long tradition with regard to output measurement. In addition, school output measures have been used in economics research on school productivity and the effects of school reforms for decades (e.g. Hanushek, 2002). The question addressed in this essay is whether school output measures could be useful for superior authorities' performance control of individual schools, and the objectives of the essay were to develop a set of requirements for performance measures used for management control, to use this framework to evaluate school output measures and to discuss whether and how school output measures could be improved and/or supplemented to be more useful for management control of schools.

The discussion of requirements for performance measures concluded that, to be useful for management control, performance measures should provide relevant, precise and complete information about an individual's or an organisation's actions and efforts to achieve the valued organisational objectives. In addition, the performance measures should be responsive to changes in these actions and efforts.

The evaluation of traditional professionally-evaluated school output measures against the requirements for performance measures used for management control concludes that such measures are relevant and responsive, but that this type of measure has limitations with respect to the precise and complete requirements. Although this type

of school output measure is responsive, the measures might also be responsive to changes in the actions of pupils and others. If traditional professionally-evaluated school output measures are adjusted for pupils' family background, if value-adding school output measures are used and/or if the individual school's performances are benchmarked against standards, targets, peers' or own prior performances assumed to have the same characteristics with respect to factors that cause noise in the measures, the information provided might be more precise, but would still have limitations respecting the precise and complete requirements.

Consumer (user)-evaluated school output measures might provide relevant information about the achievement of school objectives that would not require professional judgement, for instance objectives related to a pupil's learning environment and well being in school. However, this type of measure also has limitations with respect to the precise and complete requirements and might suffer from the same limitations with regard to the responsive requirement faced by professionally-evaluated school output measures. A combination of both professionally-evaluated school output measures and consumer-evaluated school output measures might be more complete, but it is difficult to conclude that a set of these two measures would provide more precise information about schools' and school employees' actions and efforts than they do in isolation.

The main reasons why school output measures have limitations with regard to the reliable requirement are that education is a cumulative process and that school production and school output are influenced by a pupil's own actions and efforts, as well as by the behaviours of peers, parents and others. School activity measures provide information about school activities not influenced by the contribution of these groups or previous schools to present school output. The discussion of school activity measures relative to the requirements for performance measures used for management control concludes that school activity measures are relevant and could be designed to provide more precise, complete and responsive information about the volume of activities and decisions undertaken by a school to achieve valued school output. However, school activity measures do not provide information about the quality of school activities. Therefore, school output control systems should contain both school output measures and school activity measures.

This essay contributes to both management accounting research and to school economics research in several ways. First, a framework for the evaluation of performance measures for management control has been developed and tested with regard to the evaluation of school output and activity measures. Second, the discussion of school activity measures concludes that school activity measures might contribute with regard to the provision of relevant, precise, complete and responsive information about schools' and school employees' actions and efforts to achieve valued school objectives. Third, the conclusions from the discussion propose that a focus on activity measures in future research on schools might contribute to theoretical knowledge as well as to knowledge of practice with respect to performance evaluation, performance management and performance control of schools.

A well-known management accounting and control phrase is "what is measured is managed". When superior authorities define a set of performance measures for management control, it is reasonable to assume that the measures reflect objectives regarded as valuable by the authorities, and that introduction of these performance measures affect internal activities and management control systems in the organisation controlled. To study whether and how the national and/or local school performance control systems affect a school's internal management control systems and/or operational activities might be one interesting issue for future management accounting research on schools.

School activity measurement might provide information with regard to the actions and efforts of schools and their employees. In addition, school activity measures could facilitate school activity-based management, as well as a balanced scorecard and/or a value-creation model approach to school performance management. No studies of these approaches in a school setting seem to have been carried out so far (essay 1). Therefore, studies of these approaches in a school setting, for instance by use of a constructive approach (Kasanen et al., 1993), are a further possibility for future management accounting research on schools.

## Appendix 1

Table 1: Example of annual school performance report – common school objectives (focus areas)

Common focus areas for all schools (annual contract item 2a)	Describe important achievements that have been started concerning the sector's common focus areas (include a rough estimate of when the measures started up)	Assessment of the school/unit's efforts in 2004 – tick off the appropriate category				
		Not very good	Fairly good	Good	Very good	Extremely good
Prepare organisation of the teaching work efforts in suitable groups	The cramped school has unfortunately had restrictive effect on the flexibility. Inevitably, the groups had to be bigger than desirable. We have continued the organisation from the experimental period (bases and basis groups), in particular in the 2004 spring semester.				X	
Active efforts to improve the results in reading, writing and mathematics	Participation in courses by the local authority. Reading projects. Reading workshop. Focus on performance/presentation in connection with projects. Constructing a modern library. Carried out all-day test in mathematics, in groups, for 8 <sup>th</sup> grade. "Math Day". Competence-building for teachers in use of ICT in 2004.			X		
Active pupil participation methods and use of various learning environments	Continuation of the 3-year experiment "Hand in hand with the pupil into the future". Adjustment of the teaching model according to conclusions in the evaluation of January 2004. The school's outdoor areas, local environment included in annual schemes. Both spring and fall in 2004.				X	
Appropriate organisation of the administrative work.	Continuation of the new organisation from 2001. Delegation. Department managers.					X
Follow-up of national user surveys	A great deal of work was put into follow-up of the evaluation. Pupils, parents or guardians, and employees participated, first in separate groups, then together. Very active parent council (FAU) with good working relations with the school management, in particular in spring 2004. Revision of the school's plan against bullying and racism in fall 2004 (will be concluded at all levels in spring 2005).				X	
Adapted education and documentation of all pupils' competence and social development	Always in focus. Slowed by large groups and huge challenges (many demanding pupils who are acting-out, many pupils with individual decisions and special needs). Differentiation in working plans and study hours. Have worked out assessment criteria for all subjects. Shift towards preventive work. More pupils have been offered working life practice. Efforts are made to develop an overall plan for cooperation with the home, including a system for documentation of the pupils' competence and social development.			X		
Active efforts to make the school's profile, qualities and results visible	INFO paper is published 4 times per year. Home page with general information. Various news items in media. New vision. Pupil and teacher exchange with twin towns.			X		
Take the initiative in development work	Our school is continuously in development. We set clear aims. We succeed in many things, but find some areas unsatisfactory that call for changes/adjustments and trying out new things.				X	
Follow up established routines for feedback reports					X	

**Table 2: Example of annual school performance report – school specific objectives**

List specific focus areas for your unit/school (Annual contract item 2b)	Describe important measures that have been started concerning these focus areas (include a rough estimate of when the measures started up)	Assessment of the school/unit's efforts in 2004 – tick off the appropriate category				
		Not very good	Fairly good	Good	Very good	Extremely good
Follow-up /adjustment as a result of organisational experiments	See description under item 2a. In particular in spring 2004.					X
Improve the school's environment for technology and art and design	Separate elective under Practical project work. Construction of a separate room for technology and art and design. Technology and art and design are used as method in project assignments (story lines). Technology and art and design in the Work Shop. Continuous.			X		
By April 1, 2004 the school works out a plan to recoup the negative disposition fund. Even though the school has a negative share of the disposition in 2004 as well, the results show a positive development for 2003.	Plan sent to the chief municipal education officer. Measures: <ul style="list-style-type: none"> <li>▪ Reduction of one teacher position from August 1, 2004</li> <li>▪ Substitute teacher is called upon only when it is absolutely necessary</li> </ul>				X	



**Table 3: The monthly accounting report from schools to the local school authority.**

Art	Text	Accounts	Budget (revised)	Budget variance	Budget for the year (revised)	Prognosis for the year	Budget variance
	<i>Expenditures</i>						
10	Wage expenditures	1 689 726	1 552 994	-136 732	1 759 000	1 910 000	-151 000
20	Purchase of goods and services municipal service production	28 158	32 402	4 244	36 000	66 000	-30 000
30	Purchase of goods and services that replaces municipal service production			0			0
40	Transfers (expenditures)	4 336		-4 336		4 336	-4 336
50	Financial expenditures			0			0
	Total expenditures	1 722 220	1 585 396	-136 824	1 795 000	1 980 336	-185 336
	<i>Income</i>						
60	Sales revenue	-186 016	-176 204	9 812	-199 000	-207 000	8 000
70	Refunds without sickness allowance	-4 336	-4 000	336	-4 000	-4 336	336
71	Sickness allowance	-206 619		206 619		-210 000	210 000
80	Transfers (income)			0			0
90	Financial income			0			0
	Total income	-396 971	-180 204	216 767	-203 000	-421 336	218 336
	<i>Net expenditures</i>	1 325 249	1 405 192	79 943	1 592 000	1 559 000	33 000



## Essay 3:

### Deregulation and attitudes to change

*In 2003 the former rigid class-size regulations were replaced in the Norwegian Education Act by a formulation that allows appropriate size groups instead of classes. An analysis based on basic economic theory gives reasons to expect that the reform would result in a more equal distribution of resources per pupil between schools. This essay investigates whether and how the municipalities have altered their resource allocation formulae and the allocation of resources per pupil to each school in recent years. An archival data analysis, using the Gini-coefficient as the measure of distribution equality, is conducted to analyse changes in the distribution of school resources per pupil; and a survey study is carried out to study whether the municipalities' school resource allocation models have changed. The majority of municipalities interviewed have removed the old class-size regulations as the main element in their school resource allocation formulae and replaced it by model elements that may facilitate a more equal distribution of resources per pupil between schools, but the distribution of school resources has not become more equal. The present study proposes that changes encouraged by the reforms are implemented where they are assumed to have little or no effects. Furthermore, it supports prior research findings that organisations protect themselves from the effects of reforms by designing changes to have no effects.*

## **Introduction**

When public sector reforms are introduced, the expected effects are often based on basic economic analyses. However, the reforms do not always have the expected effects. Possible reasons for this may be that the basic economic theory and assumptions used in the analyses are too simple. Such analyses may for instance not take into account that organisations employ individuals who follow their own preferences, which are not necessarily in line with the goals of the organisations, and/or the assumptions in the neoclassical theoretical analysis that organisations or individuals may be hesitant (e.g. Mellempvik & Pettersen, 1998) or resistant (Oliver, 1991) to reforms, that organisations may protect themselves from the effects of reforms (e.g Broadbent & Laughlin, 1998; Laughlin et al., 1994) and that changes caused by the reforms may take place in incremental steps (Wildavsky, 1975).

In recent years, Norwegian primary and lower secondary education has been exposed to reforms intended to facilitate school efficiency. One such recent reform is the removal of the rigid class-size regulations from the Norwegian Primary and Lower Secondary Education Act (1998) in 2003. From the beginning of the school year 2003-04, the former rigid class-size regulations were replaced by a formulation allowing the primary and lower secondary schools to divide the pupils into appropriate groups instead of classes. This relaxed input control was assumed to facilitate flexibility and more efficient use of available resources in schools (UFD, 2003b). An analysis based on basic economic theory also gives reasons to expect that the removal of the class-size regulations would result in a more equal distribution of school resources per pupil between schools, and encourage the local school authorities, the municipalities, to alter their school resource allocation formulae or procedures.

The expectations with regard to altered school resource allocation and school resource allocation models are addressed in this study. Consequently, the objectives of this essay are to study whether municipalities have achieved a more equal distribution of school resources per pupil between schools after the removal of the class-size

regulations, and whether, how and why municipalities have altered their school resource allocation formulae or procedures.

Two research approaches are used in the present study. An archival data analysis is used to study whether the distribution of resources between schools has become more equal after the removal of the class-size regulations; and a survey study is applied to investigate whether municipalities have changed or have decided to change their school resource allocation models, their school resource-allocation formulae or procedures during recent years.

Schools operate under conditions given by both central and local school authorities. In addition, demographical and geographical conditions affect both the resources needed at school level and the allocation of resources to each school. The following section sums up some of the operational conditions schools and the local school authorities operate under, and how school expenditure is dependent on geographical and demographical conditions as well as other conditions and regulations given by the central school authorities. The third section is a theoretical discussion of the effects of the removal of the class-size regulations on the allocation of resources to each school. The theoretical discussion is followed by a section in which the two research strategies chosen for the present study are discussed. The results from the archival data analysis and the survey study are summed up in sections 5 and 6, and the results are discussed further in section 7. Section 8 contains conclusions and proposals for future research.

## **The reform; and why expenditure per pupil varies**

The Norwegian public primary and lower secondary schools are owned by the Norwegian municipalities. These local school authorities must provide the schools with sufficient resources to teach the pupils according to the regulations given by the central school authorities. How many resources per pupil the different local school authorities use on their schools, and how and whether this expenditure differs between schools and municipalities, depends on regulations given by the central school

authorities, on geographical and demographical conditions, financial constraints on the local school authorities and on decisions made by local politicians.

### ***The class-size reform***

Until the summer of 2003, the Norwegian Education Act (1998) had rather rigid regulations with respect to maximum permissible class size. In short, the regulations stated that when there was only one age cohort in the class, the maximum number of pupils allowed was 28 pupils in the primary schools and 30 pupils in the lower secondary schools. Pupils from more than one age cohort were allowed to attend the same class in schools with a few pupils from each age cohort and the maximum permissible class size decreased with an increasing number of age cohorts in the class. The pupils in these classes had to belong to consecutive age cohorts; the school could not have mixed-age classes and classes consisting of a single age cohort within the same grade at the same time.

From June 2003 these class-size regulations were repealed, and section 8-2 in the Education Act (1998) was altered. The new formulation states that pupils should be divided into convenient groups. When constituting groups, the schools have to take social, pedagogical and safety factors into consideration.

### ***About variations in expenditure per pupil***

In recent years the number of pupils in a Norwegian public school has varied from 1 to about 800,<sup>1</sup> and the old class-size regulations have been an important reason for the large variances in resources allocated per pupil in Norwegian public schools (Bjørnenak, 2000; Borge et al., 2002). Due to the class-size regulations, small schools had on average smaller classes than larger schools, resulting in higher expenditure per pupil in the smaller schools than in larger ones.

In addition to the minimum resources required for ordinary teaching, schools need extra resources for other purposes. Pupils having disabilities and pupils with Norwegian as a second language are entitled to additional teacher resources and

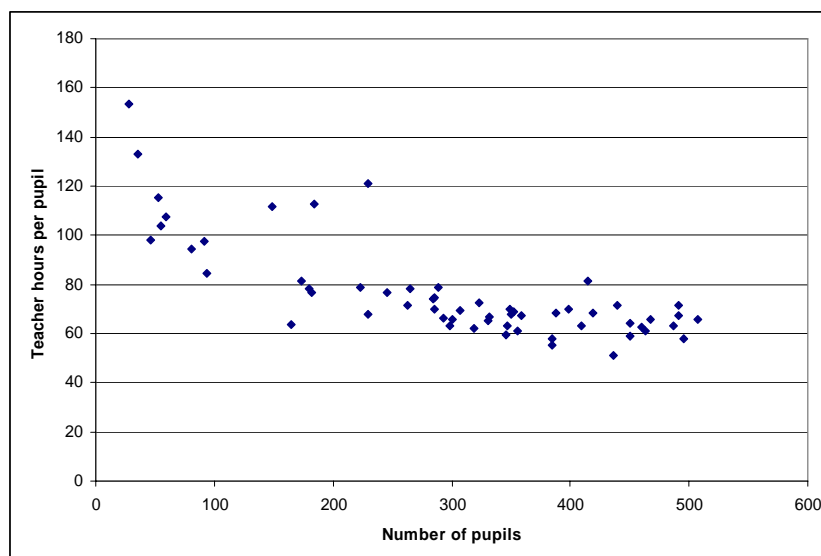
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<sup>1</sup> [www.wis.no/gsi](http://www.wis.no/gsi).

schools teaching pupils having both the official Norwegian languages variants as their mother tongue are entitled to extra school resources if this leads to extra classes or groups. Such extra classes and groups are more likely to appear in small schools than in larger schools and due to economics of scale, it is reasonable to assume that extra resources required for the reasons mentioned above will increase the variation in resources per pupil between small and larger schools. On the other hand, many municipalities allocate other types of extra resources to schools to smooth out some of the variation in resources per pupil.

In nine of the largest municipalities in Norway, additional teacher hours constituted between 39.6 and 53.0 per cent of the minimum teacher hours required to teach the classes in the school year 2001-2002.<sup>2</sup> The chart below illustrates how total resources per pupil varied between schools in a large Norwegian city in the school year 2002-03.

**Figure 2: Teacher hours per pupil (hours a year) compared to school size, primary schools (grade 1-7) in one municipality (Bergen) in the school year 2002-03 (www.wis.no/gsi)**



Low population density in large parts of the country makes small schools necessary in many Norwegian municipalities. Therefore, the Norwegian school structure and the variance in resources per pupil between schools and municipalities are both

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<sup>2</sup> <http://www.ssb.no/kostra>. Data published in 2002. In recent years, the data used to calculate the ratios are not published. The municipalities are Fredrikstad, Bærum, Drammen, Kristiansand, Sandnes, Stavanger, Bergen, Trondheim and Tromsø.

consequences of conditions that are difficult to alter in the short term. They are also the result of local preferences and the financial situation of municipalities (Borge et al., 2002).

The distribution of school resources per pupil between schools within and between municipalities may change from one year to another due to variation in the factors discussed above. In addition, the distribution of school resources may change due to changes in the regulations given by the central school authorities. One such change during recent years, in addition to the repeal of the class-size regulations in the Education Act (1998), is the change in the number of lessons per year in some grades. The Ministry of Education and Research decides the minimum number of lessons the pupils in each grade should be taught during a week and a school year. In the school year 2004-05, the number of lessons for the lower grades was increased by 5 lessons a week, two lessons a week for grade 1 and one lesson a week for grades 2-4. In the school year 2005-06, the number of lessons was increased by 4 lessons a week.<sup>3</sup> These changes may have affected the allocation of resources per pupil to each school depending on the number of classes in each grade at the various schools.

## **Theoretical analysis**

The objects clause (§ 1-2) in the Norwegian Education Act (1998) mentions a set of objectives for primary and lower secondary education. Some of these objectives aim at giving pupils “a Christian and moral upbringing, to develop their mental and physical abilities, and to give them good general knowledge so that they may become useful and independent human beings at home and in society”. It is difficult to measure the achievement or output of these and other school objectives. In the following analytical discussion, it is simply assumed that school “output” is an aggregate of the different forms of school output.

Equal results through inequality in input is a central objective for Norwegian schools (KUF, 1996). In the present analysis, equal school output for all pupils is assumed to

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<sup>3</sup> [http://odin.dep.no/kd/norsk/dok/andre\\_dok/tidsskrift/aktuelt/045071-280052/ram003-bn.html](http://odin.dep.no/kd/norsk/dok/andre_dok/tidsskrift/aktuelt/045071-280052/ram003-bn.html).



be the objective for the school production process and for the local school authorities' allocation of resources to schools.

School output, often measured by pupils' test results or final assessments, is assumed to be the result of teaching activities, the pupils' family background, peer influences, and other pupil, teacher and school characteristics (e.g. Betts & Shkolnik, 2000; Burtless, 1996; Duncombe & Yinger, 2000; Hanushek, 2002; Zimmer & Toma, 2000). Research on the relationship between school resources and school output shows ambiguous results (e.g. Hanushek, 1997), but in the following discussion it is assumed that increased use of teachers and/or other school input factors would increase the school's output, *ceteris paribus*.

In the following discussion, basic microeconomic theory is used to analyse how the resource allocation in schools and municipalities might be affected of the removal by the old class-size regulations. In the analysis, it is assumed that the school production function,  $L$ , is identical for all schools, that the local school authorities provide schools with enough resources to achieve an output level which equals  $L^*$ , and that the number of schools in the municipality is  $i$ . It is further assumed that only the schools' total amount of resources and their internal allocation of these resources to the different input factors cause differences in the schools' output. All other factors that might influence school output are assumed to be identical for all pupils and schools. It is assumed that the pupils have equal needs and abilities, or that the needs and abilities of pupils at least are equally distributed in all schools, that the pupils have the same number of lessons per week and school year in all schools, and that peer-effects are absent (or equal) in all schools. These assumptions make it possible to assume that there is one representative pupil in each school.

In the analysis, there are two types of school input factors: teachers necessary to teach the classes (groups) the required lessons a week (or school year), measured in "class teacher hours" per pupil in school  $i$ ,  $H^i$ ; and other input factors per pupil in school  $i$ ,  $M^i$ .  $M^i$  includes all other school input resources, for instance additional teacher resources (additional teacher hours), assistants, librarians, administrative employees, school material, textbooks and furniture. It is assumed that  $H^i$  increases with decreasing class (group) size, that  $L^i$  increases with increasing use of  $H^i$  and/or  $M^i$ ,

and that the marginal product decreases with increasing use of these factors. Some possibilities for substitution between the input factors are allowed for, and it is assumed that the input prices,  $q^h$  and  $q^m$ , are equal for all schools.

To simplify the analysis further, it is assumed that the schools teach pupils in only one age cohort and at the same grade level. The school production function for one representative pupil in school number  $i$  is assumed to be as in the equation below.

$$(1) L^i = L(H^i, M^i)$$

where

$$\partial L^i / \partial M^i > 0 \text{ and } \partial \partial L^i / \partial \partial M^i < 0$$

$$\partial L^i / \partial H^i > 0 \text{ and } \partial \partial L^i / \partial \partial H^i < 0$$

$$i = 1..n$$

and

- $L^i$  = the school “output” for the representative pupil in school  $i$
- $i$  = the number of schools
- $H^i$  = the minimum number of teacher hours required to teach representative pupil in school  $i$
- $M^i$  = the number of other input factors used to teach the representative pupil in school  $i$

The municipality’s allocation problem is to provide schools with the required resources to achieve the production level  $L^*$ . With a cost function,  $C^i$ , as given in (2), the costs for the output  $L^*$  are minimised when condition (3) holds. Assuming that all other factors and conditions are equal in the schools and that schools maximise output from the available resources, the municipality’s optimal allocation of resources to schools is an equal amount of resources per pupil to all schools. Figure 2 illustrates the  $L^*$  isoquant of the school production function (the bold curve) and the budget line representing an equal and minimum level of school resources required to achieve  $L^*$ , under the condition that there are no class-size regulations (the bold line). The schools’ optimal allocation of resources is labelled  $H^{opt}$  and  $M^{opt}$ , and the corresponding minimum cost is labelled  $c^{min}$ .

$$(2) C^i = q^h * H^i + q^m * M^i \text{ under the condition that } L(H^i, M^i) = L^i*$$

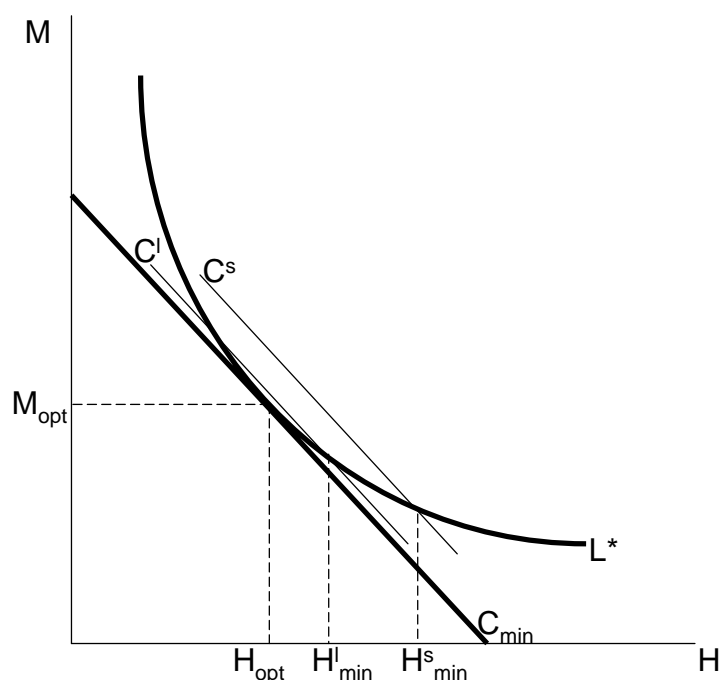
Condition for cost minimisation:

$$(3) \quad (\partial L / \partial H^i) / (\partial L / \partial M^i) = q^h / q^m$$

Where

- $C^i$  = total cost for the representative pupil school  $i$
- $I$  = the number of schools
- $q^h$  = price per unit of  $H$ , assumed to be equal for all schools
- $q^m$  = price per unit of  $M$  assumed to be equal for all schools

**Figure 1: Allocation of school resources within schools and variations in municipal allocation to schools, with and without class-size regulations**



The old class-size regulations stated how the pupils should be divided into classes, and from this were calculated the minimum number of class teacher hours,  $H^i$ , schools should use per pupil to teach pupils the number of lessons a week and year decided by the central school authorities. If a lower secondary school had 31 pupils in grade 8, the school should have two classes at that grade level. If it had 60 pupils, the number of classes should still be two. If the pupils were taught 30 hours a week and 38 weeks a year, the number of teacher hours per pupil was  $60/31 = 73.5$  in the first case and  $60/60 = 38$  in the second. As a result, the old class-size regulations caused variations in the schools' use of class teacher hours,  $H^i$ , compared to other input factors,  $M^i$ . In addition, the old regulations caused differences in the municipal distribution of

resources per pupil between schools (Bjørnenak, 2000; Borge et al., 2002). The old class-size regulations had the following consequences for the cost minimisation problem:

(4)  $Min C^i = q^h * H^i + q^m * M^i$  under the condition that

$$L(H^i, M^i) = L^* \quad \text{and}$$

$$H^i \geq H_{min}^i = ((trunc((P^j - 1)/p^{max}) + 1) * H^c) / P^j$$

where

- $H_{min}^i$  = Minimum number of class teacher hours (per year) per pupil according to the old class-size regulations
- $P^j$  = The number of pupils in school j (it is assumed that the school teach pupils in only one age cohort.)
- $p^{max}$  = The number of pupils allowed in one class
- $H^c$  = Class teacher hours per year for the class

Implying the following conditions for cost minimisation:

(5) if  $H_{opt}^i \geq H_{min}^i$  then cost minimisation if  $(\partial C^i / \partial H^i) / (\partial C^i / \partial M^i) = q^h / q^m$

if  $H_{opt}^i < H_{min}^i$  then cost minimisation if  $H^i = H_{min}^i$  implying that  $(\partial L / \partial H^i) / (\partial L / \partial M^i) < q^h / q^m$

If  $H_{opt}^i < H_{min}^i$ , the optimal solution cannot be achieved. In that case, the number of class teacher hours per pupil equals  $H_{min}^i$ . This solution implies that too many class teacher hours,  $H^i$ , are used on the expense of other input factors,  $M^i$ . Small classes will result in a higher  $H_{min}^i$  than larger classes implying that, if  $H_{opt}^i < H_{min}^i$ , the costs for a school production level equal to  $L^*$  will be higher when the classes are small than when the classes are larger. In figure 2 above, the  $H_{min}^i$  restriction is drawn for one school with large classes,  $H_{min}^l$ , and for one school with small classes,  $H_{min}^s$ . For both schools, the class-size regulations prevent them from achieving the optimal allocation of input factors and producing the output  $L^*$  at minimum cost. The total costs,  $C^l$  and  $C^s$ , are both higher than the common minimum cost,  $C^{min}$ , for  $L^*$ , and the cost per pupil differs between schools, although the model assumptions and the production (output) level are equal for the two schools.

This simple analysis illustrates that the removal of the class-size regulations could have two possible effects. First, the removal of the regulations has a potential impact on a school's internal allocation of their total resources. According to the model assumptions, the removal of the class-size regulations will encourage rational schools to change their allocation of input resources towards the optimal allocation of their budget on the different input factors. The expected substitution effect is larger for the school with small classes than the one with larger classes, but in the figure above both schools will substitute class teacher hours,  $H^i$ , with other input factors,  $M$ . The change in the allocation of input resources facilitates an increase in the school output,  $L$ , or a reduction in the schools' total costs for the output level  $L^*$ .

The second effect is related to the allocation of the municipality's total school resources. If both schools move towards the optimal allocation of their input resources for a given cost budget, the school output,  $L$ , will become different for the two schools. The school with the smallest classes and most resources per pupil will be able to achieve a higher output level than the school with the largest classes and fewest resources per pupil. If the objective of the local school authorities remains the achievement of equal school output in both (all) schools, the change in the schools' internal resource allocation might also lead to a reallocation of resources between the schools. Assuming diminishing marginal school output of additional resources, the marginal product of the last resources used in the school with most resources per pupil is less than that of the last resources used in the school with fewer resources. By reallocating resources from the school with most resources per pupil to the school with fewer resources, the aggregated output will increase for the same total amount of school resources. This positive effect of reallocation will be larger the greater the initial difference in resources per pupil between the schools.

Another possibility is that the municipality reduces the schools' resources to an equal level for the two schools, for instance a level sufficient to achieve  $L^*$ , and uses the remaining resources in other public services with larger marginal products than the schools. In this case, the effect on the allocation of resources between schools will be that the resources per pupil in the different schools is closer to equal than before the removal of the class-size regulations from the Education Act. Whether or not the municipalities choose to reduce the total amount of resources used in schools is not an

issue in this study. The present study focuses on whether the resource allocation between schools has become more equal after the removal of the old class-size regulations.

When the class-size regulations were removed from the Education Act, the Norwegian Parliament stated that the class-size regulations should still be used to determine the minimum resources for schools (UFD, 2003a). This requirement implies that reallocation of resources between schools can only be expected if the total resources of schools,  $C^i$ , exceed the minimum resources required according to the old class-size regulations,  $H_{min}^i * w^h$ . If schools have only one class in each age cohort and only receive resources required to teach the pupils the number of lessons a week decided by the central school authorities, reallocation between schools is not possible. However, due to the fact that schools normally receive more resources than required by the class-size regulations, and that the majority of schools have the possibility to choose groups of different sizes than the old classes, the minimum resource requirement may not entirely eliminate the possibility of reallocating resources within and between schools.

If the optimal use of teacher hours,  $H_{opt}$ , is higher than  $H_{min}^i$  for all (both) schools, reallocation of resources between schools cannot be expected. In a situation where the municipality gives schools an amount of resources resulting in  $H_{min}^i < H_{opt} < H_{min}^s$ , the removal of the class-size regulations could make it possible to smooth out at least some differences in resources per pupil between the schools. The reason why the old class-size regulations were removed (UFD, 2003b) indicates that the internal allocation of resources by schools has not been optimal up until 2003. It is therefore reasonable to assume that  $H_{opt}$  has been smaller than  $H_{min}$  for a large proportion of the schools.

The preceding discussion suggests that there will be a more equal distribution of the municipalities' total school resources between schools after the removal of the class-size regulations from the Education Act. This theoretical discussion also gives reason to expect that municipalities with the most unequal distribution of resources per pupil between schools may have stronger incentives to change their resource allocation than those who had a more equal distribution of resources before the removal of the class-

size regulations. However, these expectations may depend on whether the resources per pupil in the municipalities are beyond the minimum resources required according to the old class-size regulations.

In Norway, school resources have traditionally been allocated to schools by use of resource allocation formulae. There is reason to assume that changes in the allocation of resources between schools may be preceded by changes in the resource allocation formulae or procedures by the local school authorities. The fact that the removal of the class-size regulations from the Education Act is a recent event makes it possible that the local school authorities have altered their school resource allocation models, but that these changes have not yet influenced the actual allocation of resources. For this reason, the present study also studies changes in the local school authorities' resource allocation formulae and procedures.

Based on the theoretical model and the discussion above, one might not only expect that the municipalities have changed their resource allocation formulae or procedures, but also that the new models or procedures would facilitate a more equal distribution of resources per pupil between schools. In addition, the municipalities with the most unequal distribution of school resources to begin with should tend to be more eager to change their resource allocation models than those who initially had a more equal distribution of school resources.

## **Research approaches**

The main objectives in the present study are to study whether the Norwegian local school authorities have altered their school resource allocation models, and whether the distribution of their total school resources is more equal now than before the removal of the class-size regulations from the Education Act. Survey studies and archival data analyses are appropriate research strategies to answer “how many” and “how much” research questions (Yin, 1994), and in the present study both strategies are applied. An archival data analysis is used to study whether the distribution of school resources per pupil between schools is more equal now than before the removal of the class-size regulations. While a survey study is used to investigate

whether, how, when and why municipalities have altered their resource allocation formulae or procedures during recent years. The survey study is carried out as semi-structured interviews with individual employees in a number of municipalities.

### ***The archival data analysis***

An investigation of whether the municipalities have altered their resource allocation to schools after the removal of the class-size regulations from the Norwegian Education Act requires data about the distribution of school resources between pupils and schools before and after the change in regulations. The following subsections discuss how distributional inequality is measured and which types of data are used in the present study.

#### **Inequality measurement**

Several measures could be applied to assess inequality in the distribution of resources per pupil between schools (Cowell, 1995), and three measures have been considered in this study: the coefficient of variance, the Gini-coefficient and the difference in resources per pupil between the school with most resources per pupil and the school with least resources per pupil in the municipality.

Of these three measures, the Gini-coefficient and the coefficient of variance are scale-independent measures of inequality (Cowell, 1995); in other words, both measures can be used to compare the distribution of resources per pupil between schools in different years and municipalities, even if the level of resources per pupil varies between years or municipalities. Therefore, both measures might be useful for analyses of whether the distribution of school resources has become more equal. Norwegian schools differ in size, and in the school year 2002-03 about 35 per cent of Norwegian schools had less than 100 pupils.<sup>4</sup> Independent of school size, the pupils should be taught the same number of lessons. Therefore, small changes in the number of pupils might cause large changes in average resources per pupil in small schools, but only an incremental effect in larger schools. The effects on the difference between the schools with respectively least and most resources per pupil might be significant even if the allocation of school resources in the municipality as such is practically

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<sup>4</sup> [www.wis.no/gsi](http://www.wis.no/gsi).



unaltered. In other situations, there might be significant changes in the distribution of total school resources between schools, while the measure of the difference between the schools with respectively most and least resources per pupil might be unchanged. Consequently, the measure of the difference in resources per pupil between the school with most and least resources per pupil is considered to be uninteresting for analyses of equality in school resource allocation.

In the calculation of the Gini-coefficient each school is weighted by the number of pupils in the actual school, while in the calculation of the coefficient of variance the schools have equal weight. Consequently, a school with few pupils compared to the total amount of pupils in the municipality will have limited influence on the Gini-coefficient compared to its influence on the coefficient of variance. In this essay, the focus is on the distribution of school resources per pupil, and the Gini-coefficient is therefore used as a measure of school resource allocation equality.

However, to test whether the three measures considered are correlated, the measures are calculated for the 396 municipalities for at least two schools in 2002-03 and 2005-06. One municipality is excluded from the analyses due to obvious errors in the data. The table below shows that the three measures are highly correlated. The correlation coefficients between the measures are statistically significant within a one per cent level.

**Table 1: Correlation between three different measures of school resource allocational inequality.**

		Gini-coefficient 2002-03	Max – min resources 2002-03	Coefficient of variance 2002-03
Gini-coefficient 2002-03	Pearson Correlation	1	.289(**)	.389(**)
	Sig. (2-tailed)		.000	.000
	N	395	395	395
Max – min resources 2002-03	Pearson Correlation	.289(**)	1	.938(**)
	Sig. (2-tailed)	.000		.000
	N	395	395	395
Coefficient of variance 2002-03	Pearson Correlation	.389(**)	.938(**)	1
	Sig. (2-tailed)	.000	.000	
	N	395	395	395

\*\* Correlation is significant at the 0.01 level (2-tailed).

In the calculation of the Gini-coefficients, each school constitutes a group of pupils and “resources per pupil” represents the average resources per pupil in a particular school. When grouped data is used to calculate the Gini-coefficient, the Gini-coefficient may be different from the Gini-coefficient calculated on an individual data basis due to within group variance, and this problem is assumed to be larger the fewer groups there are (Abounoori & McCloughan, 2003). In Norwegian municipalities, school resources are normally not allocated to individual pupils, but to the schools. Therefore, the resources per pupil within a school are not the average of the resources the individual pupil receives, but the total amount of school resources divided by the number of pupils in the school. Consequently, grouped data and a few groups (schools) do not constitute a problem in the calculation of Gini-coefficients for the distribution of school resources per pupil between Norwegian public schools.

Standard errors are usually not reported for the Gini-coefficients, although Gini-coefficients are often calculated for a sample derived from a larger population (Giles, 2004). The proposed procedures for standard error estimation have been mathematically complex or computationally intensive, although simpler approaches are also proposed (Giles, 2004). In the present study, the Gini-coefficients are calculated for the whole population of schools and pupils in Norway, as well as in the individual Norwegian municipalities. Of this reasons, and because of the complexity of standard error estimation, standard errors for the Gini-coefficients have not been estimated.

### **The archival data**

To study whether the municipalities have altered their resource allocation to schools after the removal of the class-size regulations from the Education Act, data is required about the resources allocated to each school and the number of pupils at each school before and after the removal of the class-size regulations. Statistics Norway<sup>5</sup> collects data from the municipalities, but financial school-level data is not collected. Consequently, it is impossible to analyse each school’s total expenditure without collecting such data from the individual school or municipality. However, every autumn all schools have to report non-financial school data to the national school

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<sup>5</sup> <http://www.ssb.no/english/>.

authorities,<sup>6</sup> for instance: the total number of teacher hours<sup>7</sup> the schools plan to use during the school year; and how teacher hours are budgeted to different purposes such as teaching ordinary classes or groups the required number of lessons a week, teaching pupils with Norwegian as a second language, teaching pupils with other special needs and several other purposes. They also report the number of pupils at each grade level and some man-labour year data.

Using teacher hours or man-labour years to calculate the Gini-coefficients has the advantage that this data is not influenced by variances in the teacher wage-levels between schools and municipalities. The disadvantage is that the number of man-labour years or the number of teacher hours does not represent all school input factors. However, when expenditure related to school buildings are not included, labour costs constitute about 95% of a school's total operating costs,<sup>8</sup> and teacher man-labour years constitute about 90 per cent of all man-labour years at the school level. Hence, it is reasonable to assume that the teacher labour costs constitute about 85-90 per cent of the total operating costs in Norwegian schools.

Although the total teacher hours measure does not include all the school input resources, the number of teacher hours does represent a significant part of a school's total operating costs, and the resources not included are only marginally altered in the period studied.<sup>9</sup> In addition, teacher hours is considered to be a valid indicator for the total school input resources (NOU, 2005:18), and a better proxy for the resources used to teach the pupils than the number of man-labour years (Borge et al., 2002).

Therefore, in the present study, the total number of teacher hours plus the number of assistant hours divided by two (an assistant hour costs approximately half as much as a teacher hour) are used as a proxy for the schools' operating costs.

The teacher hour data used in this study includes all the planned use of teacher hours in schools during the school year, regardless of the purposes they are budgeted for. It can be questioned whether it is correct or appropriate to include teacher hours

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<sup>6</sup> [www.wis.no/gsi](http://www.wis.no/gsi).

<sup>7</sup> Each teacher man-labour year constitutes a number of "teacher hours" dependent on the teacher's age, what subjects the teacher teach and at what grade.

<sup>8</sup> [www.ssb.no/kostra](http://www.ssb.no/kostra).

<sup>9</sup> [www.wis.no/gsi](http://www.wis.no/gsi).

budgeted to pupils with special needs and/or pupils with Norwegian as a second language, as well as other teacher hours budgeted to different purposes. Some will claim that these hours are earmarked to particular pupils or purposes and should be excluded from the study. Others will claim that these hours are a part of the total resources of a school, and might be used differently in the different schools. However, whether or not these resources are included probably has little or only a marginal effect on the analyses. The pupils with special needs attend school for several years and there are few reasons to assume that the proportion of pupils with special needs, and the way the teaching of these pupils is organised, have changed systematically or noticeably over the time relevant for this study.

Another issue that can be raised is whether schools teaching only pupils with special needs due to severe disabilities, or a large proportion of pupils with such special needs, should be included in the study. These pupils require a lot of resources compared to other pupils. When they are taught in separate schools, these schools will occur in the data file as schools with a large amount of resources per pupil. If they are taught at their local school, the school's total resources per pupil will only be moderately affected. For this reason, the way the teaching of pupils with special needs is organised may affect the inequality measures. However, there is no reason to assume that the number of pupils with special needs, and how the teaching of these pupils is organised, have changed in a way that would affect the distribution of school resources systematically over the years included in the analyses. In the GSI database, some schools are listed as schools teaching only pupils with special needs. These schools are not included in the calculation of the Gini-coefficients. All other Norwegian public schools are included in the archival data analyses.

### ***The survey study approach***

No systematic information exists in national databases about the resource allocation formulae or procedures of local school authorities. Therefore, a survey study was carried out to investigate whether the municipalities have changed their resource (budget) allocation formulae or procedures, whether a change is prepared but not yet put into use, and how and why the resource allocation models have been changed or not. The school resource allocation models are often complex, and it may be easier to

sort out the desired information when using interviews rather than a questionnaire. Thus, the survey study was carried out in the form of telephone interviews, with individual employees chosen from a sample of municipalities.

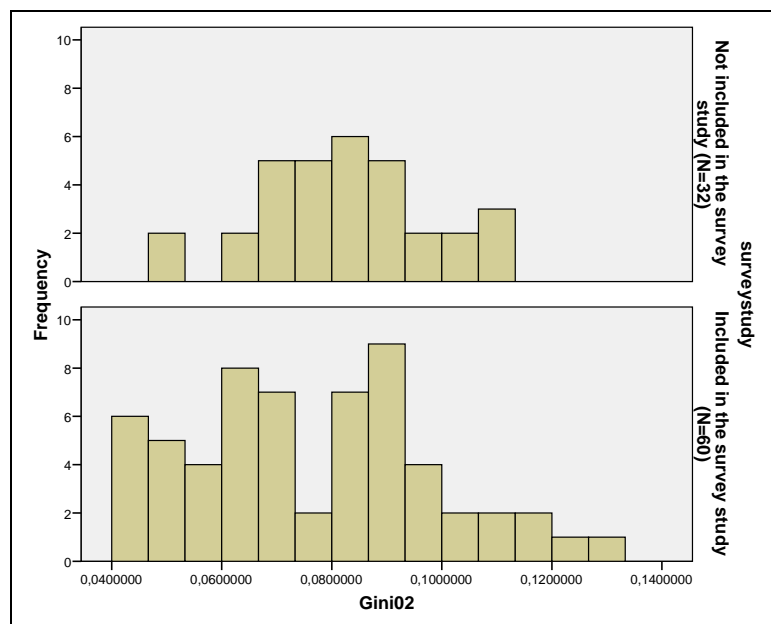
Telephone interviews have the advantage that both the interviewer and the interviewee can ask additional questions if something is unclear and requires further explanation. Another advantage is that it is probably easier and less time-consuming for the respondents to answer the questions on the phone than to write the answers on a questionnaire. It is therefore reasonable to assume that telephone interviews will result in a higher response rate than a mail or e-mail questionnaire.

Assuming that formal resource allocation models or procedures are more common in municipalities with several schools than in those with few schools, municipalities with minimum 10 schools in the school year 2002-2003 were selected for the survey study. Based on the theoretical discussion, there is also reason to assume that the municipalities that initially had the most unequal distribution of resources per pupil between schools may have stronger incentives than the other municipalities when it comes to changing their resource allocation formulae after the removal of the class-size regulations. To make it possible to study this assumption, 30 municipalities with the most equal and 30 municipalities with the most unequal distribution of resources per pupil were selected for the survey study.

To make this selection, three measures were considered: the difference in resources per pupil between the school using the most resources per pupil and that using the least resources per pupil; the municipality-level coefficient of variance measures; and the municipality-level Gini-coefficients. The Gini-coefficient takes the number of pupils in each school into consideration and is therefore assumed to be the best selection criterion of the three. However, a programme that could easily calculate municipality-level Gini-coefficients was not available for the researcher when the selection was made of the municipalities for the survey study. The difference in resources per pupil between the school using the most resources per pupil and the school using the least was considered to be the second best criterion and was consequently used to select the 60 municipalities for the interviews.

When the municipality-level Gini-coefficients were calculated, it was revealed that the sample of 60 municipalities selected did not contain the 30 municipalities with the highest and the 30 municipalities with the lowest Gini-coefficients. However, the figure below illustrates that the sample selected for the survey study includes the municipalities with the highest and lowest Gini-coefficients and that the municipalities not selected for the survey study to a larger extent are concentrated around the median Gini-coefficient value which is equal to 0.0800 for the sample of 92 municipalities. Consequently, even if the sample of municipalities selected for the survey-study does not include only the municipalities with lowest and highest Gini-coefficients, municipalities with the most equal and unequal distribution of school resources are overrepresented in the sample.

**Figure 2: Municipalities with at least 10 schools selected and not selected for the survey study<sup>10</sup>**



One person was interviewed in each municipality who is responsible for or who knows the resource allocation formula or procedure. The interviews focused on the main elements in the present resource allocation model and whether these have been changed or whether changes have been proposed over the past 5-6 years. If the resource allocation model had been changed, the respondents were also asked about the main elements in the former model, when the model was changed, how it was

<sup>10</sup> Descriptive statistics enclosed in table 4 in appendix 1.

changed and whether the change was met with some kind of resistance and from whom. It was also of interest to find out why the formula was changed or not changed, and whether changes had been proposed but rejected in recent years.

The interviews were performed as semi-structured interviews. An interview guide<sup>11</sup> was prepared before the interviews. After the first 4-5 interviews, the interview guide was modified and some questions initially formalised with predetermined alternative answers were made less formalised. The interviews also revealed that some questions were difficult to answer, for instance the questions about resource allocation by judgement. As a result, some questions are excluded from the analyses. Notes were written during the interviews and the answers were categorised by the researcher.

## **Has the resource allocation changed?**

From the theoretical discussion, it was expected that the distribution of resources per pupil between the schools should be more equal after than before the removal of the class-size regulations. However, the Gini-coefficients<sup>12</sup> for all Norwegian public schools for the four most recent school years presented in table 1 below indicate increasing inequality. Also, when Gini-coefficients are calculated for all public primary schools teaching pupils in grades 1 to 7 and for all the lower secondary schools separately, the results show the same tendency; the distribution of school resources has become more unequal from 2002-03 to 2005-06.

**Table 2: Gini-coefficient for Norwegian public schools<sup>13</sup>**

	2002-03	2003-04	2004-05	2005-06	% change from 2002-03 to 2005-06
<b>Gini coefficient, all public schools</b>	0.1185	0.1215	0.1195	0.1240	4.6 %
<b>Gini coefficient, primary schools teaching grade 1 to 7</b>	0.1146	0.1167	0.1161	0.1242	8.4 %
<b>Gini coefficient, lower secondary schools</b>	0.0898	0.0964	0.0925	0.0942	4.9 %

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<sup>11</sup> The interview guide is enclosed in appendix 2.

<sup>12</sup> All Gini-coefficients are calculated by using Stata.

<sup>13</sup> Some more descriptive school statistics are enclosed in tables 1, 2 and 3 in Appendix 1.

### ***Changes in the municipality-level Gini-coefficients***

Changes in the distribution of resources between pupils and schools may be caused by alterations at the municipality level, as well as by changes in resources per pupil between municipalities. In order to investigate whether the distribution of resources within the individual municipalities has become more equal during recent years, municipality-level Gini-coefficients for all municipalities with at least two schools are calculated and compared for the school year 2002-03 and the school year 2005-06. All ordinary public schools are included in the calculations of the municipality-level Gini-coefficients.

Summary statistics of the municipality-level Gini-coefficients for the school years 2002-03 and 2005-06 and a variable representing the change in the Gini-coefficient from 2002-03 to 2005-06 are presented in the table below. Because changes in the school structure, especially reductions in the number of schools, will normally result in a more equal distribution of the total school resources, the average Gini-coefficients are also compared for the 302 municipalities with the same number of schools in the two school years. As expected from the theoretical discussion, the average Gini-coefficient value has decreased from 2002-03 to 2005-06. This indicates that the distribution of resources within the municipalities is, on average, more equal in 2005-06 than in 2002-03. In addition, the quartile measures in the table below indicate that the peak of the distribution has been somewhat narrowed from 2002-03 to 2005-06, while the max and min values indicate that the tails have been longer as well.



**Table 3: Gini coefficient in 2002-03 and 2005-06, and changes in the Gini-coefficients from 2002-03 to 2005-06. Municipalities with at least two schools**

Gini-coefficient statistics <sup>1</sup>	Municipalities with at least 2 schools in 2002-03 and 2005-06			Municipalities with at least 2 schools and the same number of schools in 2002-03 and 2005-06		
	Gini 2002-03	Gini 2005-06	Gini05 minus Gini02 <sup>2</sup>	Gini 2002-03	Gini 2005-06	Gini05 minus Gini02 <sup>2</sup>
Min	0.0027	0.0011	-.1784	0.0027	0.0018	-.1784
Max	0.2078	0.2754	.1279	0.2078	0.2754	.1279
Mean	0.0600	0.0554	.0046	0.0568	0.0534	.0034
Median	0.0594	0.0530	.0039	0.0563	0.0520	.0025
25 % quartile	0.0407	0.0348	-.0089	0.0357	0.0341	-.0100
75 % quartile	0.0789	0.0713	.0177	0.0755	0.0520	.0159
Skewness Statistic <sup>2</sup>	.481	1.337	-.254	.667	1.666	-.265
Skewness Std. Error	.123	.123	.123	.140	.140	.140
Kurtosis Statistic	1.200	6.651	6.182	1.760	9.618	7.202
Kurtosis Std. Error	.245	.245	.245	.280	.280	.280
Number of municipalities	395	395	395	302	302	302

<sup>1</sup> All statistics are estimated by use of SPSS;

<sup>2</sup> This variable represent the changes in the Gini-coefficients from 2002-03 to 2005-06

The reduction in the average Gini-coefficient level from 2002-03 to 2005-06 indicates that the distribution of school resources has become more equal on average, but it does not tell how many of the municipalities have a more equal distribution of resources in 2005-06 than in 2002-03, nor whether the change is significant. The table below shows that for 58.7 per cent of the 395 municipalities the Gini-coefficients have decreased, while for 41.3 per cent they have increased. The result of a sign test for related samples shows that the number of municipalities with a reduction in the Gini-coefficient is significantly larger than the number of municipalities with a larger Gini-coefficient in 2005-06 than in 2002-03; either all municipalities or only the municipalities with the same number of schools are included in the analyses.

The skewness and kurtosis statistics in table 3 indicate that the distribution of the Gini-coefficients, as well as the difference between the Gini-coefficient in 2005-06 and in 2002-03, deviate from a normal distribution, especially for the school year 2005-06. For this reason, the Wilcoxon Mann-Withney ranked sign test for paired samples, which is a non-parametric parallel to the paired sample t-test for comparison of means (Wonnacot & Wonnacot, 1977), is used to test whether the orientation of the Gini-coefficients have changed significantly from 2002-03 to 2005-06. The test

statistics for all municipalities, as well as for the municipalities with the same number of schools in the two years, indicate that the changes in the Gini-coefficients are statistically significant at a 5 per cent level.

**Table 4: Municipalities with increased and decreased Gini-coefficient from 2002-03 to 2005-06**

	All municipalities	Municipalities with the same number of schools the two years
	Number	Number
Reduction: Gini0203 > Gini0506	232 (58.7 %)	169 (56.0 %)
Increase: Gini0203 < Gini0506	163 (41.3 %)	133 (44.0 %)
Total	395 (100.0 %)	302 (100.0 %)
<i>Sign test – related samples (Gini05 - Gini02):</i>		
Z	-3,421	-2,014
Asymp. Sig. (2-tailed)	,001	,044
<i>Wilcoxon Mann-Withney signed ranks test:</i>		
Z	-3,780(a)	-2,308(a)
Asymp. Sig. (2-tailed)	,000	,021

a - Based on positive ranks.

The theoretical discussion proposed that municipalities with the most unequal distribution of school resources may also have the strongest incentives to make their distribution more equal when the class-size regulations were removed. In order to study whether a larger proportion of municipalities with the most unequal initial distribution of their total school resources have a more equal distribution of school resources in 2005-06 than in 2002-03, a Wilcoxon Mann-Withney ranked signed test is applied. As expected, table 5 shows that the municipalities that have a more equal distribution in their school resources in 2005-06 than in 2002-03 had on average significantly higher Gini-coefficients in 2002-03 than those municipalities with a more unequal distribution of school resources in 2005-06 than in 2002-03.

**Table 5: Difference between municipalities with increased and decreased Gini-coefficients with regard to the level of the Gini-coefficients in 2002-03**

	Change in the Gini-coefficient from 2002-03 to 2005-06 – all municipalities (N=395)		Change in the Gini-coefficient from 2002-03 to 2005-06 –municipalities with equal number of schools in the two years (N=302)	
	Reduction in the Gini-coefficients from 2002-03 to 2005-06	Increase in the Gini-coefficient from 2002-03 to 2005-06	Reduction in the Gini-coefficients from 2002-03 to 2005-06	Increase in the Gini-coefficient from 2002-03 to 2005-06
Mean Gini-coefficient 2002-03	0.0685	0.0478	0.0665	0.0445
N	232	163	169	133
<i>Wilcoxon Mann-Whitney U signed rank test results:</i>				
Mean rank	232.25	149.26	181.39	113.52
Sum of ranks	53881	24329	30655	15098
Mann-Whitney U	10963		6187	
Wilcoxon W	24329.0		15098.0	
Z	-7.112		-6.705	
Asymp. Sig. (2-tailed)	.000		.000	

### ***Altered school structure***

To study whether the changes in the municipalities' Gini-coefficients are associated with the changes in the number of schools, the municipalities are sorted according to unaltered, increased and decreased number of schools, and increased and decreased Gini-coefficients. The results presented in the table below suggest that a changed school structure may explain some changes in the municipality level Gini-coefficients. 23.9 per cent of the municipalities have altered the number of schools from 2002-03 to 2005-06, and for 67.7 per cent (63) of these municipalities the Gini-coefficients have decreased. A significant proportion of the municipalities that have reduced the number of schools have a more equal distribution of their school resources in 2005-06 than in 2002-03, while the opposite applies to the municipalities with several schools more in 2005-06 than in 2002-03. For this group, the number of municipalities with a more unequal distribution of school resources in 2005-06 is higher than for those with a more equal distribution of school resources. The chi-square statistics indicate statistically significant differences on a 5 per cent level between the three groups of municipalities with the same number of schools, a decreased number of schools and an increased number of schools respectively with respect to changes in the Gini-coefficient.

**Table 6: Number of municipalities with increased or decreased number of schools from 2002-03 to 2005-06 sorted by change in the Gini-coefficient (Column percentages in brackets)**

Changes from 2002-03 to 2005-06:	Municipalities with the same number of schools	Municipalities with reduced number of schools	Municipalities with increased number of schools	Total
Reduction: Gini02 > Gini05	169 (56.0 %)	59 (74.7 %)	4 (28.6 %)	232 (58.7 %)
Increase: Gini02 < Gini05	133 (44.0 %)	20 (25.3 %)	10 (71.4 %)	163 (41.3 %)
Total	302 (100.0 %)	79 (100.0 %)	14 (100.0 %)	395 (100.0 %)
<i>Pearson Chi-Square</i>				
Value	14,505			
df	2			
Asymp. Sig. (2-sided)	,001			

### ***Other factors influencing the Gini-coefficients?***

Associations between some municipality characteristics and the change in the Gini-coefficients are investigated in order to study whether the municipalities, with respectively increased and decreased Gini-coefficients, have some other common characteristics that may explain why some municipalities have a more equal distribution of school resources in 2005-06 than in 2002-03 while others have a more unequal distribution. The characteristics investigated are the number of schools, the number of pupils, the average number of pupils per school and the resources per pupil in 2002-03, and the percentage change in the same variables from 2002-03 to 2005-06. The number of pupils reflects the size of the municipality; the number of schools may say something about the complexity in the allocation process, but may also reflect the size of the municipality; the number of pupils per school indicates the school structure and is associated with the changes in the number of schools studied above; the school structure may be affected by demographical and geographical conditions, as well as by political decisions and the municipalities' total recourses; and the resources per pupils may be affected by school structure, political prioritising and the municipalities' total recourses. Because the skewness and kurtosis statistics for the eight variables indicate that several of the variables are not normally distributed<sup>14</sup>, the Wilcoxon Mann-Whitney ranked sign test for independent samples

<sup>14</sup> cf. tables 5 and 6 in appendix 1

is used to test differences between municipalities with respectively increased or decreased Gini-coefficients from 2002-03 to 2005-06.

**Table 7: Differences between the municipalities with increased and decreased Gini-coefficients, all municipalities**

						Wilcoxon Mann-Whitney ranked sign test		
		N	Mean value	Min. value	Max. value	Mean Rank	Z	Asymp. Sig. (2-tailed)
The number of schools in 02/03	Decrease: Gini02 > Gini05	232	7.57	2	122	202.6		
	Increase: Gini02<Gini05	163	8,00	2	88	192.8		
	Total	395					-0,874	0,382
The number of pupils in 02/03	Decrease: Gini02 > Gini05	232	1384	67	48514	196.5		
	Increase: Gini02<Gini05	163	1658	60	29304	201.3		
	Total	395					-0,394	0,693
The average school size in 02/03	Decrease: Gini02 > Gini05	232	148.7	24.6	509.0	192.5		
	Increase: Gini02<Gini05	163	155.7	30.0	383.1	207.0		
	Total	395					-1,256	0,209
Resources per pupil in 02/03	Decrease: Gini02 > Gini05	232	99.5	69.2	185.2	201.7		
	Increase: Gini02<Gini05	163	97.7	66.6	165.7	193.9		
	Total	395					-0,627	0,531
% change in total number of pupils from 2002/03 to 2005/06	Decrease: Gini02 > Gini05	232	-1.43	-61.6	24.5	189.7		
	Increase: Gini02<Gini05	163	-,19	-25.6	14.8	210.9		
	Total	395					-1,889	<b>0,059</b>
% change in total number of schools from 2002/03 to 2005/06	Decrease: Gini02 > Gini05	232	-5.52	-60.0	18.2	184.6		
	Increase: Gini02<Gini05	163	-1.70	-33.3	20.0	218.2		
	Total	395					-3,86	<b>0,00</b>
% change in average school size from 2002/03 to 2005/06	Decrease: Gini02 > Gini05	232	6.02	-24.1	92.9	207.9		
	Increase: Gini02<Gini05	163	2.17	-17.0	66.2	185.2		
	Total	395					-1,882	<b>0,06</b>
% change in resources per pupil from 2002/03 to 2005/06	Decrease: Gini02 > Gini05	232	1.59	-33.5	39.5	196.5		
	Increase: Gini02<Gini05	163	2,79	-20.1	65,73	201.3		
	Total	395					-0,305	0,76

The results of these analyses show that there are some differences between the two groups of municipalities. The group with a more equal distribution of school resources in 2005-06 than in 2002-03 have on average fewer schools, fewer pupils, smaller schools and used on average more resources per pupil than those municipalities that had a more unequal distribution. In addition, the municipalities with a more equal

distribution of school resources also have a higher percentage decrease in the total number of pupils and schools, a higher percentage increase in the average school size and a smaller increase in the percentage increase of resources per pupil. For the percentage changes in the number of schools, the difference is significant on a 5% level for the percentage change in pupils per school, while for average school size the difference is significant at a 10% significance level.

When only municipalities with the same number of schools in the two school years are examined (cf. table 8 below), the average number of schools and the average resources per pupil in the school year 2002-03 is almost identical for the two groups of municipalities. The municipalities with a more equal distribution have on average fewer pupils but a larger number of pupils per school. These municipalities have a larger decrease in the number of pupils and consequently average school size, and the change in resources per pupil is smaller than for those with a more unequal distribution of school resources. However, the Wilcoxon Mann-Whitney signed rank test for independent groups shows no statistically significant differences on a 5 per cent level between municipalities with respectively increased and decreased Gini-coefficients from the school year 2002-03 to 2005-06 for any of the variables tested.

**Table 8: Differences between the municipalities with increased and decreased Gini-coefficients, municipalities with the same number of schools in the two years**

		N	Mean value	Min. value	Max. value	Wilcoxon Mann-Whitney ranked sign test		
						Mean Rank	Z	Asymp. Sig. (2-tailed)
The number of schools in 02/03	Decrease: Gini02 > Gini05	169	6.36	2	29	155,3		
	Increase: Gini02<Gini05	134	6.35	2	53	146,7		
	Total	303					-0,85	0,395
The number of pupils in 02/03	Decrease: Gini02 > Gini05	169	1136.6	67.00	8675	154,7		
	Increase: Gini02<Gini05	134	1194.4	60.00	19245	147,4		
	Total	303					-0,717	0,474
The average school size in 02/03	Decrease: Gini02 > Gini05	169	157.16	33.50	509.0	154,2		
	Increase: Gini02<Gini05	134	150.29	30.00	383.1	148,1		
	Total	303					-0,595	0,552
Resources per pupil in 02/03	Decrease: Gini02 > Gini05	169	98.53	69.16	185.2	150,2		
	Increase: Gini02<Gini05	134	98.54	66.64	165.7	153,1		
	Total	303					-0,29	0,772
% change in total number of pupils from 2002-03 to 2005-06	Decrease: Gini02 > Gini05	169	-0.67	-24.07	24.46	148,6		
	Increase: Gini02<Gini05	134	-0.38	-13.56	14.78	155,1		
	Total	303					-0,642	0,521
% change in average school size from 2002/ 03 to 2005-06	Decrease: Gini02 > Gini05	169	-0.67	-24.07	24.46	148,6		
	Increase: Gini02<Gini05	134	-0.38	-13.56	14.78	155,1		
	Total	303					-0,642	0,521
% change in resources per pupil from 2002-03 to 2005-06	Decrease: Gini02 > Gini05	169	2.47	-19.71	39.50	153,3		
	Increase: Gini02<Gini05	134	5.00	-20.13	65,73	149,2		
	Total	303					-0,408	0,683

### **Summing up**

While the Gini-coefficients calculated for all Norwegian schools indicate increased distributional inequality from 2002-03 to 2005-06, the analyses of the municipality level Gini-coefficients show that 58.6 per cent of all municipalities with at least 2 schools have a more equal distribution of their resources in the school year 2005-06. In addition, there is a tendency for municipalities with the greatest unequal distribution of school resources initially to change to a more equal distribution after the reform than for municipalities with lower initial Gini-coefficients. This result also

holds when only municipalities with the same number of schools in 2005-06 and in 2002-03 are analysed.

The above analyses indicate that changes in the municipalities' school structure is an important reason for changes in the distribution of resources per pupil between schools, and that neither the number of pupils, the number of schools, the average school size and average resources per pupils in 2002-03, nor the changes in these variables from 2002-03 to 2005-06, seem to explain the changes in the Gini-coefficients when the effects of changes in the number of schools is controlled for. In addition, changes in the number of pupils in the different school districts and/or age cohorts and changes in the distribution of resources caused by the alterations to the number of lessons for the different grade levels are examples of factors that may have affected the municipality-level Gini-coefficients. These factors are not controlled for in the analysis. Consequently, it is difficult to conclude that the larger number of municipalities with a decreased Gini-coefficient value from 2002-03 to 2005-06 than that for increased Gini-coefficients is a consequence of the removal of the class-size regulations, and that there are differences between the municipalities with the respectively largest and smallest Gini-coefficients in 2002-03 with regard to changes in the Gini-coefficients from 2002-03 to 2005-06.

## **Have the resource allocation formulae been changed?**

The main objectives of the survey study are to study whether and how the municipalities have altered their school resource allocation models after the removal of the class-size regulations from the Education Act. In addition, it is interesting to study whether those municipalities that have altered their model have some common characteristics, for instance with regard to the level of distributional inequality, the main element of their former and present models and when a new model was put into use. Additional factors to be considered include how the total number of pupils, the average amount of resources per pupil in the municipality, the average school size, the total number of schools and the percentage change in these variables differ between the municipalities with altered models and unaltered models.



### **The sample**

60 municipalities with at least 10 schools in the school year 2002-03 were selected for the phone interviews and 49 municipalities were interviewed. The questions were sent by e-mail to 3 of the respondents, on request from the interviewees. The questions were also sent to 8 municipalities by e-mail because, after several phone calls, it was impossible to establish contact with anyone who knew the local resource allocation models. None of these municipalities replied to the e-mail. 3 persons did not want to answer the questions. The total response rate was 81.7 per cent, which constitutes 53.3 per cent of the population of 92 municipalities with at least 10 schools and 11.3 per cent of all Norwegian municipalities in 2002. The interviews were carried out in December 2005.

Even if the above archival data analysis did not indicate that municipality size, measured by the number of pupils, total number of schools, average school size and average school resources per pupil, is associated with the changes in the municipality-level Gini-coefficients, it is interesting to test whether the 49 municipalities interviewed differ significantly from the 43 municipalities not interviewed with regard to these characteristics. Some of these variables are not normally distributed.<sup>15</sup> Therefore, the Wilcoxon Mann-Withney ranked sign test is applied. The results summed up in the table below show no statistically significant differences between the two groups of municipalities with regard to the variables tested.

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<sup>15</sup> cf. tables 7, 8 and 9 in appendix 1

**Table 9: Comparison between municipalities interviewed and not interviewed<sup>16</sup>**

2002-03	Mean values			Test statistics. municipalities interviewed vs municipalities not interviewed			
	Municipalities with at least 10 schools	Municipalities interviewed	Municipalities not interviewed	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
N	92	49	43				
Gini-coefficient	0.0786	0.0747	.0823	826	2051	-1.78	0.075
Number of schools	18.0	21.7	19.2	1030.5	2255.5	-0.181	0.856
Number of pupils	4290	3671	4920	971	1917	-0.646	0.519
Average school size	207.9	211.7	203.7	941	1887	-0.88	0.379
Resources per pupil	84.8	83.6	86.5	883	2108	-1.334	0.182

### ***Prior and present school resource allocation models***

38 of the 49 respondents said that their municipality had changed their school resource allocation formula or procedure recently, and seven said that their local school authorities had considered changing their school resource allocation model. The results from a simple sign test indicate that the number of municipalities that have changed their school resource allocation models is significantly higher level than the number of municipalities that have not changed their model at a 5 per cent significance (cf. table 10 below). This result allows for a more general conclusion, that a significant proportion of the Norwegian municipalities with at least 10 schools have changed their school resource allocation formulae in recent years.

**Table 10: Municipalities that have changed or not changed their resources allocation model**

Municipalities with changed or not changed their resources allocation model	Values
Yes, the model is changed	38
No, the model is not changed	4
No, but he municipality prepares a change	7
Total	49
<i>Sign tests between yes and no answers (38:11):</i>	
Z	-6.002
Asymp. Sig. (2-tailed) / Exact Sig. (2-tailed)	0.000

The theoretical discussion proposed that the municipalities with the most unequal resource allocation to begin with may have stronger incentives to change their

<sup>16</sup> Some more descriptive statistics is enclosed in table 8 in appendix 1.

resource allocation formula than those who initially had a more equal distribution. The distribution of the Gini-coefficient for 2002-03 does not differ significantly from a normal distribution.<sup>17</sup> Therefore, a t-test for comparison of means in independent samples is used to study whether the Gini-coefficients before the removal of the class size regulations, i.e. the Gini-coefficients in 2002-03, differ between the municipalities with respectively altered and non-altered resource allocation models.

Table 11 shows that the municipalities that have altered their school resource allocation models have on average lower Gini-coefficients than those municipalities that have not altered their models, and the difference is statistically significant within a 5 % significance level.

**Table 11: Comparison of mean Gini-coefficient 2002-03 for municipalities with respectively altered and not altered models; t-test for independent samples**

<b>Has the resource allocation model recently changed</b>	<b>Yes</b>	<b>No</b>
<i>Gini-coefficient 2002-03:</i>		
N	38	11
Mean	0,0718	0,0872
Std. Deviation	0,0222	0,0120
Std. Error Mean	0,0036	0,0036
t	-3,01	
df	31,362	
Sig. (2-tailed)	,005	

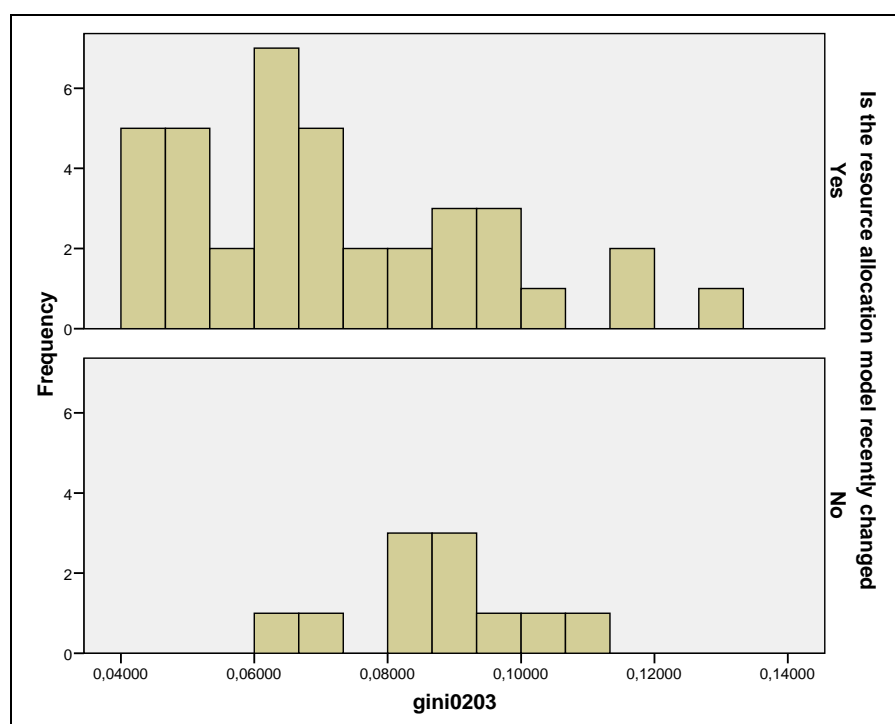
Equal variances not assumed

Figure 3 below illustrates that, even if the municipalities that have altered their resource allocation models on an average have lower Gini-coefficients in 2002-03 than those with unaltered models, the municipalities with the highest Gini-coefficients in 2002-03 have also altered their models.

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<sup>17</sup> cf. table 8 in appendix 1

**Figure 3: Distribution of the municipalities with altered and unaltered models with regard to Gini-coefficient in 2002-03**



### ***How the models have been altered***

The respondents were asked about the main element in the present and former resource allocation models. The table below shows considerable changes with respect to the main element in the resource allocation models.

**Table 12: The main element in the former and present resource allocation models**

The main element in the former and present resource allocation model	Former model	Present model
The old class-size regulations	41	15
An amount of money or a number of hours per pupil	1	10
An amount of money or a number of hours per school and per pupil	3	15
Other/ unknown model	4	9
<b>Total</b>	<b>49</b>	<b>49</b>

The next table shows the main element in the new and former resource allocation models. The table confirms that the municipalities have discarded the old class-size regulations as a basis for their resource allocation, and that models using the number of pupils as the main element, possibly in combination with the amount of resources per school, are now preferred by many municipalities. Thirty-two of the

municipalities that have changed their resource allocation model used the old class-size regulations in their former model. Of these municipalities, only six still use a model based on these regulations. Twenty of the municipalities that have left the old class-size regulations have chosen a model where the schools' budgets are based on the number of pupils, while twelve have chosen a model based on the number of pupils and a fixed amount of money or teacher hours per school. Two of the municipalities in the "other" group have chosen a model based on groups rather than classes. For two municipalities, the main element in the new model is different for the primary and lower secondary schools: the lower secondary schools receive an amount of resources per pupil, whereas the primary schools get resources according to the main element in the old model. One municipality has changed from budget negotiations to a model based on the old class-size regulations, and one has changed from negotiations to a model based on the number of pupils in the schools. For the other municipalities that have made changes in their models recently, the main element is the same in the new and former models.

**Table 13: The main element in the former and present resource allocation models for the municipalities with altered models**

The main element in the old resource allocation model	The main element in the present resource allocation model				
	The old class-size regulations	An amount of money or a number of hours per pupil	An amount of money or a number of hours per school and per pupil	Other	Total
The old class-size regulations	6	8	12	6	32
An amount of money or a number of hours per pupil	0	1	0	0	1
An amount of money or a number of hours per school and per pupil	0	0	2	0	2
Other	1	1	0	1	3
<b>Total</b>	<b>7</b>	<b>10</b>	<b>14</b>	<b>7</b>	<b>38</b>

### ***When were the models altered?***

The point of time at which the change in the resource allocation model was carried out may indicate whether the changes have been encouraged by the removal of the class-size regulations or not. Table 14 presents what the respondents remembered about the point of time when the altered model was put into use. Zero indicates that the model is decided to be put into use in the school year 2006-07, 1 indicates that the model was

used in the school year 2005-06. The table shows that most of the municipalities with altered resource allocation models have changed it in the same year as the removal of the class-size regulations from the Education Act took place or more recently; one of the municipalities altered their model before the removal of the class-size regulations. This municipality belongs to a group of municipalities that tested out relaxed class-size regulations before the reform was fully carried out. The table below sums up how many years ago the last changes in the school resource allocation models were put into use.

**Table 14: Years since the new models were put into use**

<b>The models were put into use ... years ago. School year in brackets</b>	<b>Total</b>
0 (=2006-07)	1
1 (=2005-06)	10
2 (=2004-05)	17
3 (=2003-04)	7
4 (=2002-03)	1
6 (=2000-01)	1
<b>Total</b>	<b>37</b>
Missing	1

To investigate possible associations between the initial level of the Gini-coefficient and the time when the new models were put into use, the correlation coefficients between these two variables are calculated. The correlation coefficient between the Gini-coefficients in 2002-03 and when the new models were put into use indicates that the level of the Gini-coefficient in 2002-03 is not associated with how soon after the removal of the class-size regulations the models were changed. However, of the 11 municipalities that have not yet implemented a new model, seven plan to introduce a new model in the near future. If we assume that these seven municipalities actually implement a new model in the school year 2006-07, the correlation coefficient is statistically significant on a 10% significance level, and this coefficient indicates that the municipalities with the most equal distribution of school resources between pupils and schools initially put a new model into use somewhat earlier than those who had a more unequal distribution of their school resources in 2002-03.

**Table 15: Correlation between Gini-coefficients in 2002-03 and when the altered models were implemented**

		Gini-coefficient 2002-03
How many years ago was the altered model put into use – models actually altered	Pearson Correlation	-.167
	Sig. (2-tailed)	.316
	N	38
How many years ago was the altered model put into use – models actually altered + planned to be altered	Pearson Correlation	-.254
	Sig. (2-tailed)	.096
	N	44

### ***Why have the models been changed***

As a supplement to understanding the changes in the models, the respondents were asked why the models were changed, whether the change was met with some kind of resistance and by whom. These questions were asked as open questions. Devolved financial management is another recent reform in several Norwegian municipalities (Opedal et al., 2002) that may have encouraged changes in the local resource allocation models. Therefore, the respondents were also asked whether the schools have devolved financial responsibility or not. Several of the respondents mentioned two or more reasons for the changes in their resource allocation formula. The reasons mentioned are summed up in the table below.

Only seven of the respondents mentioned the removal of the class-size regulations directly, but most of the reasons mentioned are related to effects from the change in class-size regulations. Several of the respondents mentioned that the old model was difficult to understand. One said that, until the resource allocation formula changed, only one or two employees in the municipality understood how the budgets for different schools were calculated and it was difficult for headmasters and others to predict the financial consequences of changes in the number of pupils. The simplification of the model makes it possible for “everyone” both to understand and to predict the effects of a change in the number of pupils on a school’s budget. Others mentioned that the schools are now considered equal to other public services. One of the respondents put it like this: *“the schools have been considered different from nursing homes, kindergartens and other public services for years. Now, the schools have to argue for their resources in the same way as the other public services”*.

**Table 16: Why the resource allocation models were altered. (Some respondents mentioned more than one reason.)**

	The number of respondents that mention the reason
The old model was difficult, a simpler model was wanted.	9
The old model was unpredictable due to the old class-size regulations	7
We wanted to smooth out differences between the schools.	6
We wanted to reduce the differences between small and large classes	2
The old class-size regulations were removed from the Education Act	7
Pedagogical changes in the schools	4
The old allocation of resources was unfair	3
Other reasons	14

None of the respondents reported strong resistance against the new resource allocation model, but some told of some scepticism or resistance from headmasters. None reported resistance from teachers or parents, but one did mention some scepticism from politicians. A t-test for comparison of means for independent samples indicate that there are no significant differences between the municipalities that showed no or some form of scepticism or resistance to a new model with regard to school resource distribution equality in 2002-03.

**Table 17: Resistance/scepticism to changes in the resource allocation models**

Resistance/scepticism to model change	No	Yes, some
Gini-coefficient 2002-03:		
N	17	19
Mean	.0682	,0744
t-test for comparison of means:		
t	-,805	
df	34	
Sig. (2-tailed)	,426	

Equal variances assumed

### ***Has the distribution of school resources changed?***

A significant proportion of the municipalities interviewed have altered their models in ways that might facilitate a more equal distribution of school resources. But what has happened with respect to distributional equality for the municipalities that altered their models compared to those that have made no changes?

As opposed to what would be expected, the municipalities that have altered their models have on average a 0.377 per cent increase in the Gini-coefficient from 2002-



03 to 2005-06. For those that have not altered their resource allocation models, the average reduction in their Gini-coefficients was 5.12 per cent. However, the Wilcoxon Mann-Whitney signed rank test results presented in the table below show that the difference between the two groups is not statistically significant on a 5 per cent level, neither when the change nor when the percentage change in the Gini-coefficients is analysed.

**Table 18: Differences between municipalities with and without altered models with respect to change in the Gini-coefficient from 2002-03 to 2005-06.**

	Change in the Gini-coefficient from 2002-03 to 2005-06		% change in the Gini-coefficient from 2002-03 to 2005-06	
	Municipalities that have altered their model recently	Municipalities that have not altered their model recently	Municipalities that have altered their model recently	Municipalities that have not altered their model recently
Mean	-0.0023	-0.0059	.3770	-5.1204
N	38	11	38	11
<i>Wilcoxon Mann-Whitney U signed rank test results:</i>				
Mean rank	25.61	22.91	25.53	23.18
Sum of ranks	973.0	252.0	970.0	255.0
Mann-Whitney U				189.0
Wilcoxon W		252.0		255.0
Z		-0.551		-.479
Asymp. Sig. (2-tailed)		0.582		.632

It is reasonable to assume that the effects of changes in the resource allocation models take some time. Therefore, it is interesting to investigate the correlation between when the model was altered and the change in the Gini-coefficients. However, the correlation's coefficients presented in the table below indicate that neither the change in the Gini-coefficients nor the percentage change in the Gini-coefficients from 2002-03 to 2005-06 correlate with the years since the models were put into use.

**Table 19: Correlation coefficients**

		Years since the models were put into use	Change in the Gini-coefficients from 2002-03 to 2005-06	% change in the Gini-coefficients from 2002-03 to 2005-06
Years since the models were put into use	Pearson Correlation	1	,088	,043
	Sig. (2-tailed)		,606	,801
	N	37	37	37
Change in the Gini-coefficients from 2002-03 to 2005-06	Pearson Correlation	,088	1	,963(**)
	Sig. (2-tailed)	,606		,000
	N	37	38	38
% change in Gini-coefficients from 2002-03 to 2005-06	Pearson Correlation	,043	,963(**)	1
	Sig. (2-tailed)	,801	,000	
	N	37	38	38

\*\* Correlation is significant at the 0.01 level (2-tailed).

To investigate further possible explanations for the changes in the municipality Gini-coefficients, associations between the main elements in the present models for the municipalities that have altered their model and an increase or decrease in Gini-coefficients from 2002-03 to 2005-06 are explored.

**Table 20: Main element in the new model and changes in the Gini-coefficients**

	Main element in new model			Total
	The old class size regulations	An amount of money or a number of hours per pupil or per pupil and school	Other	
gini02 > gini05	5	11	6	22
gini02 < gini05	2	13	1	16
Total	7	24	7	38
<i>Pearson Chi-Square</i>				
Value				4,181(a)
df				2
Asymp. Sig. (2-sided)				,124

a - 4 cells (66,7%) have expected count less than 5. The minimum expected count is 2,95.

In many Norwegian municipalities, traditional line-item budgeting has been replaced by devolved financial management (Hovik & Stigen, 2004). In almost all the municipalities interviewed, the schools have devolved financial responsibility. However, there are differences between the municipalities concerning what resources the headmasters are responsible for, and the extent to which the schools are allowed to set their own priorities. The results in the table below show no differences between the municipalities that have changed and not changed their resource allocation models

with respect to whether or not the schools have at least some kind of devolved financial responsibility.

**Table 21: Devolved financial responsibility and changes in the resource allocation models**

Devolved financial responsibility?	Has the resource allocation model recently changed?		
	Yes	No	Total
Yes	31	9	40
No	7	2	9
Total	38	11	49
<i>Pearson Chi-Square</i>			
Value	.000(b)		
df	1		
Asymp. Sig. (2-sided)	.986		

b - 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.02.

Finally, it is studied whether the municipalities that have altered their models have other characteristics with respect to municipality size, average school size, the number of schools, the average resources used per pupil and/or the percentage changes in these variables than those municipalities that have not changed their models. Some of these variables are not normally distributed.<sup>18</sup> Therefore, the Wilcoxon-Mann-Whitney sum of ranks test is used to test whether the municipalities with altered and unaltered resource allocation models differ with respect to these characteristics,

The results from the Wilcoxon-Mann-Whitney tests are summed up in the table below. The table shows a statistically significant difference between the two groups of municipalities with respect to average resources per pupil in the municipalities in the school year 2002-03,<sup>19</sup> and in the percentage change in the average school size from 2002-03 to 2005-06. The average amount of resources per pupil in the school year 2002-03, measured as the average number of teacher hours a year, is significantly lower in the group of municipalities that have changed their models than in the group with unaltered models, and the average school size has increased in the municipalities with altered models and decreased marginally in those with unaltered models.

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<sup>18</sup> cf. table 8 in appendix 1

<sup>19</sup> All teacher hours divided by all pupils in the school year 2002-03.

**Table 22: Variables that may explain changes in the resource allocation models**

Variables analysed	Recently changed model?	N	Mean value	Mean Rank	Sum of Ranks	Wilcoxon Mann-Whitney ranked sign test		
						Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Pupils in 2002-03	Yes	38	3883.3	25.61	973.00			
	No	11	3229.6	22.91	252.00			
	Total	49				252	-0.551	0.582
Schools in 2002-03	Yes	38	17.3	24.34	925.00			
	No	11	16.5	27.27	300.00			
	Total	49				925	-0.603	0.546
Average school size 2002-03	Yes	38	213.2	25.89	984.00			
	No	11	192.7	21.91	241.00			
	Total	49				241	-0.815	0.415
Resources per pupil in 2002-03	Yes	38	81.9	22.05	838.00			
	No	11	89.9	35.18	387.00			
	Total	49				838	-2.684	0.007
% change in total number of pupils from 2002/ 03 to 2005-06	Yes	38	2.052	26.96	1024.50			
	No	11	.006	18.23	200.50			
	Total	49				200.5	-1.785	0.074
% change in total number of schools from 2002-03 to 2005-06	Yes	38	-5.255	23.59	896.50			
	No	11	.629	29.86	328.50			
	Total	49				896.5	-1.405	0.16
% change in average school size from 2002-03 to 2005-06	Yes	38	8.816	27.74	1054.00			
	No	11	-.025	15.55	171.00			
	Total	49				171	-2.492	0.013
% change in resources per pupil from 2002-03 to 2005-06	Yes	38	1.961	23.55	895.00			
	No	11	4.609	30.00	330.00			
	Total	49				895	-1.318	0.188

The first of these results indicates that scarce resources in the municipalities encourage changes in the school resource allocation model. However, another interpretation is also possible. Low Gini-coefficients and relatively little resources per pupil may be the result of a school structure involving schools large enough to make possible relatively few resources per pupil and small differences in resources per pupil between schools. This interpretation is in line with the prior finding that it is the municipalities with the most equal distribution of school resources that are most eager to alter their resource allocation model after the removal of the class-size regulations. This interpretation is also supported by a statistically significant correlation between the Gini-coefficient in 2002-03 and the average resources per pupil in the same school year. For the 49 municipalities in the survey study, the Pearson correlation coefficient is 0.397 and this is significant at the one per cent level.

The other statistically significant result in the table above is the significant difference between the municipalities with altered and unaltered models with respect to the percentage change in average school size. This has increased in the municipalities that have altered their models and marginally decreased in the other municipalities. These changes may be caused by changes in the number of pupils, in the number of schools, or in both of these. The results in the table above indicate that the municipalities with altered models have had an increase on average in the number of pupils, a decrease in the number of schools and increased average school size. Although the increased average school size is the only variable that shows a statistically significant difference between the municipalities with altered and unaltered models, the results propose that an increased average school size, caused by changes in the school structure and an increasing number of pupils, may (also) be associated with changes in the school resource allocation models.

### ***Summing up the survey study findings***

The interviews with the 49 municipalities revealed that a significant number of municipalities altered their school resource allocation model in the same year that the class-size regulations were removed from the Education Act, or more recently. As opposed to what was expected, a larger proportion of the municipalities with an initially relatively low Gini-coefficient made such changes than was the case for those with higher Gini-coefficients in the school year 2002-03. A large proportion of the municipalities have kept the old class-size regulations and many have introduced a model with the number of pupils as the main element, possibly in combination with an amount of resources per school.

The new models may facilitate a more equal distribution of resources between the pupils, but the model changes seem to have had little effect on the distribution of school resources. The reduction in the average Gini-coefficients from 2002-03 to 2005-06 for the municipalities with altered models is smaller than for those with unaltered models, but the difference is not statistically significant. The respondents have reported that the models were altered mainly to reduce differences between schools and classes and to make the resource allocation simpler and more understandable. They have also stated that the new models were met with little or no resistance, but with some scepticism.

Other possible explanations about why some municipalities have changed their resource allocation models while others have not have been studied. There was an investigation of whether there are any differences with respect to the presence of devolved financial management, average school size, the number of schools in the municipalities, the number of pupils in the municipalities, resources per pupil in the municipality and the percentage change in the last four variables from 2002-03 to 2005-06. The results showed a statistically significant difference between the two groups in resources per pupil in 2002-03 and in percentage change in average school size. Resources per pupil in 2002-03 were less in the municipalities with altered models, and the increase in percentage change in average school size was larger for those with altered models than for the other group.

## **Discussion and conclusions**

The archival data analysis has revealed that the majority of all municipalities with at least two schools have a more equal distribution of school resources per pupil between schools in 2005-06 than in 2002-03. In addition and as expected, a significant number of the municipalities with the highest Gini-coefficients in 2002-03 have a more equal distribution of their resources in 2005-06 than is the case for those with the initial lowest Gini-coefficients. However, further analyses indicated that changes in the number of pupils and in the school structure are possible explanations for the changes in the Gini-coefficients.

Of the 49 municipalities interviewed, 38 have altered their resource allocation model in the school year 2002-03 or later. The majority of these municipalities have removed the old class-size regulations as the main element in their resource allocation model in favour of an amount of money or a number of teacher hours per pupil. It is reasonable to assume that these new models might facilitate a more equal distribution of school resources. However, as opposed to what was expected, further analyses indicate that municipalities with the most equal initial distribution of school resources have been most eager to change their resources allocation model, and the groups of municipalities with altered models tend to have an increasing number of pupils and

have used less resources per pupil on average when compared to the municipalities with unaltered models.

The results summed up above raise several questions, the first of which is whether the changes in the distribution of school resources and the changes in school resource allocation models are the results of the removal of the class-size regulations in June 2003.

### ***Has the class size regulation reform caused the changes?***

The effects of the removal of the class-size regulations have not occurred in a vacuum, but are accompanied by possible effects of other changes in the schools' and local school authorities' environment and operational conditions. It has been mentioned that changes in the number of schools, other changes in the school structure and changes in the number of lessons for the lowest grades in the years studied are factors that may have caused changes in the distribution of school resources between pupils and schools from 2002-03 to 2005-06. Other changes that may affect the distribution of school resources between pupils and schools are demographical changes, changes in the total school resources and altered political priorities. Consequently, it is difficult to conclude that the tendency towards a more equal distribution of school resources per pupil in 2005-06 compared to 2002-03 is caused by the removal of the class-size regulations.

When it comes to the findings in the survey-study, it is more reasonable to assume that the changes in the school resource allocation models are caused by the removal of the class-size regulations. The respondents were not asked whether changes in the resource allocation model are more or less regular events, nor were they asked when the previous change prior to the latest change in the model took place. However, the fact that so many municipalities have left the old class-size regulations as the main element in their resource allocation model and that the changes in the resource allocation model have taken place in the same year as or soon after the removal of the class-size regulations from the Education Act, as well as the reasons for the changes mentioned by the respondents, all indicate that the removal of the class-size regulations have caused the changes in the resource allocation model.

### ***Who have made changes in their models?***

The findings from the survey study propose that the municipalities with the most equal distribution of school resources initially, with the least resources per pupil on average in the school year 2002-03 and with the largest increases in the number of pupils and average school size have made changes in their school resource allocation models, rather than the municipalities with the most unequal initial distribution of school resources. These findings indicate that the analysis based on neoclassical economic theory is too simple to predict which municipalities would make changes to their school resource allocation models.

There has been an investigation of whether or not factors other than the initial distribution of school resources are associated with the municipalities that have altered their models. These analyses found that the municipalities with altered models used less resources per pupil in 2002-03 and the average increase in the total number of pupils were higher in these cases. In addition, on average, the municipalities with altered models have reduced the number of schools, while the other municipalities have a modest percentage increase on average in the number of schools. As a consequence, the changes in the total number of pupils in the municipality and the average change in school size from 2002-03 to 2005-06 has increased for the municipalities with altered models and modestly decreased for the other municipalities.

These results allow for several interpretations with regard to the reasons why municipalities have altered their school resource allocation models. One possible interpretation is that those municipalities that use less resources per pupil already have a tight control on their school resources, and that municipalities with a tight control on their resources are those that are most eager to improve or maintain their control regime through changes in their resource allocation model, possibly by changing their actual allocation of school resource as well. Consequently, the comparatively fewer resources per pupil and changes in the school structure in the municipalities with altered models proposes that changing the resource allocation model is a means to control total school expenditure, and that it is the municipalities that already have



tight control of their school resources that make changes to their school resources allocation model.

Another possible interpretation might be that it is easier to make changes when the number of pupils increases. In such a situation, reallocation might take place without effects, or at least with less effect, on the number of teachers in the different schools and on the total school resources, even if resources per pupil diminish. Other possible interpretations are that scarce school resources and an increasing number of pupils have enforced changes in the resources allocation model and in the school structure, or that it might be easier to make changes in the resource allocation models when other changes are taking place or being implemented in the school sector at the same time, for instance changes in the school structure.

### ***Altered models – no distributional effects***

Even if the majority of the interviewed municipalities have altered their school resources allocation model and the new model is assumed to facilitate a more equal distribution of school resources, the survey study analyses indicate that the allocation of resources per pupil between schools has not become more equal in the municipalities with altered models than in those with unaltered models from the school years 2002-03 to 2005-06.

One possible explanation is that  $H_{opt} > H_{min}$  for all or at least a large proportion of schools before the removal of the class-size regulations and, consequently, a more equal distribution of resources between schools could not be expected. Another possible explanation is related to the fact that the class-size regulations are maintained as a minimum resource requirement for the municipalities' budget allocation to schools. Although the resource allocation models are changed, it is possible that this constraint prevents or reduces the possibility to make changes in the actual allocation of resources to each school. A third possible explanation is that the effects of removing the class-size regulations on the school resource allocation are eliminated by the effects of other factors or changes.

However, incremental budgeting and the tendency to carry through changes in incremental steps (Wildavsky, 1978) is also a possible explanation. In a study of the

introduction of a formula funding system and devolved financial management in three Local Education Authorities (LEAs) in England, researchers found that the LEAs tended to “fabricate” budget allocation formulas that “maintain historical pattern of allocation and promote incremental pattern of budgeting” (Edwards et al., 1996). It is possible that the Norwegian local school authorities have followed the same strategy when introducing the changes in their resource allocation model. Many of the respondents reported that the new resource allocation model was developed in cooperation with some or all of the headmasters, and several said that the model was adjusted to reduce or avoid large reallocation effects in the short term. In combination with the facts that the new models were met with little scepticism or resistance and that no changes in the resource allocation are measured, these facts make it reasonable to assume that the main reason why changes in the resource allocation models have not affected the actual distribution of school resources is that the new models are constructed to have little or no effect on the actual distribution of school resources in the short term. Instead, they are constructed to maintain the historical pattern of allocation and to make it possible to introduce changes in incremental steps.

A reallocation of resources between schools will result in financial gains in some schools and financial losses in others, and this might be a potential reason for resistance (Oliver, 1991). In order to avoid noise and resistance, it might be a rational and wise choice to implement changes in small steps (Johnsen, 1999), small enough to make it possible for the schools suffering from decreasing resources to adjust their activities gradually, for instance by reducing their staff by natural turnover rather than by firing teachers and/or other employees.

Although the changes in the school resources allocation models seems to have little if any effect on the actual distribution of school resources, the changes might have other effects with regard to the control of schools and school resources. Some of the respondents mentioned that the former models were difficult to understand and the effects of changes were difficult to state except for the one or few with a detailed knowledge of the model; others mentioned that schools had been treated different from nursing homes, kindergartens and other public services in the municipality budget allocation process. Simplifying the school resource allocation models and making them more understandable might make it easier for local politicians and other

superior authorities to treat the schools in the same way as other public services. Consequently, the removal of the class-size regulations, the changes in the municipalities' resource allocation model and the introduction of devolved financial responsibility may be interpreted as elements in a kind of "paradigm change" with respect to how schools are controlled by their superior authorities.

### ***Are Norwegian municipalities hesitant reformers?***

A question already touched upon is related to apparently quick response by the local school authorities to the removal of the class-size regulations from the Education Act. The survey study reveals that the municipalities have left the old class-size regulations in their resources allocation models and that the changes occurred soon after the change in the Education Act in many of the municipalities. This is not in accordance with the impression of Norway as a hesitant reformer (Essay 4; Mellemvik & Pettersen, 1998). However, there is reason to ask whether this apparently quick response is fast, or whether the removal of the class-size regulations from the Education Act brought forward changes that had been met with hesitation or resistance for a long time.

When the Norwegian Government replaced several of the earmarked grants to the municipalities with a bloc grant based on objective criteria in 1986, the municipalities were allowed to discard the former rigid school resource allocation regulations based on the class-size regulations<sup>20</sup> as a basis for their allocation of resources to the schools. However, the survey study shows that most municipalities have chosen to continue using the old class-size regulations in their school resource allocation model until recently. It is therefore possible that the municipalities have been hesitant or resistant to fundamental changes in their resource allocation model for more than 15 years, and that the removal of the class-size regulations has encouraged the municipalities to carry through changes that may have been discussed and demanded for years. Maybe one of the respondents was right when he said that, "*the time was more than ready for a change*".

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<sup>20</sup> The circular letter F-3/85 from the Ministry of Education and earlier versions of the F-3 circular letter.

## ***Are the findings and results trustworthy?***

### **Internal validity**

The Gini-coefficient is a widely used and acknowledged measure of distributional equality. Therefore, it is reasonable to assume that the analyses of the the Gini-coefficient measures provide valid and reliable information with regard to equality of the distribution of school resources and how the distribution have changed. Different distributions, however, may result in equal Gini-coefficients (Cowell, 1995).

Consequently, the distribution of school resources within a municipality could have changed even if the Gini-coefficient is unaltered.

The Gini-coefficients measure distributional equality of school resources. In these calculations, teacher hours are used as a proxy measure for all school resources. As mentioned previously, teacher hours are considered a valid measure of total school operating cost (NOU, 2005;18).

Due to characteristics of the data, mainly non-parametric tests are applied. These methods are robust (Wonnacot & Wonnacot, 1977), and it is reasonable to consider the statistical significant findings as valid. This applies to the findings with respect to changes in the Gini-coefficients and school resource allocation formulae, as well as to factors associated with the changes.

### **External validity**

In the survey study municipalities with a minimum of 10 schools have been selected for the interviews and 49 of 92 municipalities were interviewed. Even though the municipalities selected for the survey study are not a random selection of the 92 municipalities, the large proportion of these municipalities interviewed makes it reasonable to assume that the results might be valid for the municipalities with at a minimum 10 schools. However, the fact that the 49 municipalities interviewed are not a random selection of all Norwegian municipalities makes it reasonable to assume that the findings from the survey-study are not valid for all Norwegian municipalities. On the other hand, all Norwegian municipalities have been exposed to the same regulations, traditions and reforms with regard to school resource allocation, and the investigation of whether the number of schools is associated with the changes in the

resource allocation formulae, does not indicate such an association. Therefore, it is reasonable to assume that these findings also apply to the municipalities with less than 10 schools.

### **Reliability**

The school archival data used in the analyses are collected on behalf of Norwegian school authorities, and these types of school data has been collected on a yearly basis for a long period of time. If there are systematic measurement errors in the data, it is reasonable to assume that the errors are of the same or a similar form from one year to the other. Hence, the possible effects of such errors would be reduced when data from different years are used for comparisons and analyses of change, and it is reasonable to assume that the way the data is used make them reliable.

## **Conclusions and proposals for future research**

The objectives of this study have been to investigate whether Norwegian municipalities have altered their school resource allocation and their school resource allocation models after the removal of the rigid class-size regulations from the Norwegian Education Act in 2003. The theoretical analysis based on basic economics theory led to expectations that the municipalities would alter their resource allocation to create a more equal distribution of the total school resources per pupil between schools and also alter their resource allocation models. In addition, it was expected that a larger proportion of the municipalities with the most unequal distribution of resources would have narrowed their distribution of school resources than would occur in municipalities with a more equal distribution of school resources before the reform; and that municipalities with the most unequal distribution of school resources should be most eager to change their school resource allocation models.

The results from the municipality level analyses of the archival data are in line with the expectations, but because the results could just as easily be caused by other structural changes in recent years, it is difficult to conclude that the changes are caused by the removal of the class-size regulations.

The survey study finds that a significant proportion of the municipalities have altered their resource allocation models or procedures after the removal of the class-size regulations and that, contrary to what was expected, the municipalities with the most equal allocation of school resources to begin with have been most willing to change their resource allocation models. However, the distribution of school resources per pupil between schools has not become more equal in the municipalities with altered models than in those with unaltered models from 2002-03 to 2005-06. When and how the resource allocation models were altered indicate that the changes in the school resource allocation models are caused by the removal of the class-size regulations.

The differences between the expected results from the theoretical analyses and the empirical findings propose that basic economic theory is too simple in explaining why and how organisations respond to reforms. The simple economic analysis in section two did not, for instance, take into consideration that changes take place in organisations with stakeholders that may have different interests than their superiors and with power to affect decisions (Hardy, 1996), that changes may be met with resistance (Oliver, 1991) or hesitation (Mellempvik & Pettersen, 1998) and that changes take time (Borge, Rattsø, & Sørensen, 1995) and may therefore unfold differently in different organisations and under different circumstances. As opposed to the expectations based on the simple neoclassical analysis, the findings in the present study propose that changes seem to be carried through when they are assumed to have little or no effect. In addition, the findings from the present study support prior findings in that the changes in the municipalities' school resource allocation models are constructed in order to have little or no effect (Edwards et al., 1996), at least in the short term.

Although the changes in the municipalities' school resource allocation models apparently contradict the impression of Norway as a hesitant reformer (Essay 4; Mellempvik & Pettersen, 1998), the fact may be that the findings from the present survey study support rather than contradict these prior studies. In addition, the present study proposes that previous hesitation may be brought to an end by the introduction of a new reform.

The theoretical proposals from the present study, i.e. that reforms are carried through in organisations where the reforms are expected to have little or no effect and that changes are constructed to have limited or no effect, may be interesting topics for future research. Why and when hesitation or resistance to changes are brought to an end is another proposal for future research.

The findings in the present study propose that the removal of the class-size regulations have had little effect on the actual allocation of resources per pupil between schools. The findings from interviews in four schools also indicate that the reform has not had the expected impact on how the teaching is organised and on the allocation of resources within the schools (Essay 4). The fact that the schools and local school authorities have not responded as expected to the class-size regulation reform makes it appropriate to propose further research on when and how organisations respond to reforms, and to recommend central or local authorities to take into consideration that organisations and employees do not always respond in accordance with expectations based on basic neoclassical economic theory when reforms are introduced.

The present study has applied simple statistical methods, a limited number of variables have been included in the analyses and a large group of municipalities, the municipalities with less than 10 schools, have been omitted in the survey study. Consequently, it could be questioned whether the results are valid as well as whether the simple statistical analyses have reveal all interesting relationship in the data. Therefore, a third proposition is to make further research on the issues studied in this essay. Data providing possibilities to control for factors that might influence the distribution of school resources and changes in the school resource allocation formulae and use of more sophisticated statistical methods might reveal associations and relations not revealed by the present analyses. Such factors are for instance changes in lessons a week for some grades, resources required for pupils due to disabilities, pupils having Norwegian as their second language and teaching both official Norwegian languages as the mother tongue in the same school.

## Appendix 1: Additional statistics

**Table 1: Gini coefficients and descriptive statistics, all ordinary primary and lower secondary public schools**

	2002-03	2003-04	2004-05	2005-06	% change from 2002-02 to 2005-06
Gini coefficient	0.1185	0.1215	0.1195	0.1240	4.6 %
Number of schools	3 124	3 086	3 050	3 008	-3.7 %
Total number of pupils	598289	604992	605146	604977	1.1 %
Total number of teacher hours including assistant hours/2	5078736 3	5110448 2.5	5176863 7.5	5213624 4	2.7 %
<i>Pupils per school</i>					
Average	191.5	196.0	198.4	201.1	5.0 %
Median	162.0	168.0	169.0	171.0	5.6 %
Lower quartile	64.0	67.0	68.0	69.0	7.8 %
Upper quartile	297.0	306.8	308.0	310.0	4.4 %
Minimum	2.0	1.0	1.0	1.0	-50.0 %
Maximum	803.0	786.0	788.0	808.0	0.6 %
<i>Teacher hours per pupil All teacher hours/ all pupils</i>					
	84.9	84.5	85.5	86.2	1.5 %
<i>Teacher hours per pupil - each school:</i>					
Average	103.1	101.8	103.5	105.4	2.2 %
Median	90.7	90.7	90.7	91.7	1.1 %
Lower quartile	78.0	77.0	77.8	78.3	0.4 %
Upper quartile	111.6	109.5	110.8	111.5	-0.1 %
Minimum	47.5	41.8	51.7*	46.6*	-1.9 %
Maximum	861.3	1140.0	1596.0	3163.0	267.2 %

\* One school is recorded with 2.2 teacher hours per pupil; data error.



**Table 2: Inequality measures and descriptive statistics, all 1-7 primary schools**

	2002-03	2003-04	2004-05	2005-06	% change from 2002-02 to 2005-06
Gini coefficient	0.1146	0.1167	0.1161	0.1242	8.4 %
Number of schools	1851	1820	1798	1764	-4.7 %
Total number of pupils	342832	341807	336654	333887	-2.6 %
Total number of teacher hours including assistant hours/2	2772623 4	2748748 5	2762147 1	2775327 8	0.1 %
<i>Pupils per school</i>					
Average	185.2	187.8	187.2	189.3	2.2 %
Median	147.0	148.0	151.0	156.0	6.1 %
Lower quartile	58.0	61.0	61.0	63.8	10.0 %
Upper quartile	301.5	305.3	303.0	301.3	-0.1 %
Minimum	2.0	3.0	2.0	2.0	0.0 %
Maximum	759.0	766.0	788.0	808.0	6.5 %
<i>Teacher hours per pupil All teacher hours/ all pupils</i>					
	80.9	80.4	82.0	83.1	2.7 %
<i>Teacher hours per pupil - each school:</i>					
Average	98.3	95.6	98.5	100.5	2.2 %
Median	87.1	87.5	88.2	88.8	2.0 %
Lower quartile	74.9	74.0	75.3	75.8	1.2 %
Upper quartile	107.7	105.3	107.2	107.0	-0.6 %
Minimum	47.5	41.8	56.0	49.6	4.4 %
Maximum	846.0	497.8	671.0	2623.0	210.0 %

**Table 3: Inequality measures and descriptive statistics lower secondary schools**

	2002-03	2003-04	2004-05	2005-06	% change from 2002-02 to 2005-06
Gini coefficient	0.0898	0.0964	0.0925	0.0942	4.9 %
Number of schools	483	486	477	468	-3.1 %
Total number of pupils	129246	134247	135365	134732	4.2 %
Total number of teacher hours including assistant hours/2	1111114 4	1151826 0	1162736 1	1139814 7	2.6 %
<i>Pupils per school</i>					
Average	267.6	276.2	283.8	287.9	7.6 %
Median	264.0	270.0	280.0	284.0	7.6 %
Lower quartile	183.5	192.5	200.0	203.8	11.1 %
Upper quartile	340.0	345.0	355.0	359.0	5.6 %
Minimum	3.0	4.0	6.0	3.0	0.0 %
Maximum	598.0	613.0	612.0	613.0	2.5 %
<i>Teacher hours per pupil: All teacher hours/ all pupils</i>					
	86.0	85.8	85.9	84.6	-1.6 %
<i>Teacher hours per pupil - each school:</i>					
Average	95.2	94.9	95.2	98.0	2.9 %
Median	86.6	87.0	87.2	85.7	-1.0 %
Lower quartile	77.9	77.9	77.3	76.1	-2.3 %
Upper quartile	98.4	98.0	97.8	96.6	-1.8 %
Minimum	64.2	57.2	51.7	58.1*	-9.5 %
Maximum	861.3	953.5	1596.0	3163.0	267.2 %

\* One school is recorded with 2,2 hours per pupil.

**Table 4: Descriptive statistics, municipalities with at least 10 schools selected and not selected for the survey study**

Municipalities with at least 10 schools in 2002-03	Total	Municipalities selected for the survey study	Municipalities not selected for the survey study
Number of municipalities	92	60	32
<b>Gini coefficients 2002-03</b>			
Mean	.0786	.0764	.0827
Minimum	.0411	.0411	.0469
Maximum	.1298	.1298	.1133
Median	.0800	.0733	.0837
25 - quartile	.0650	.0584	.0712
75 - quartile	.0921	.0918	.0928
Skewness	.152	.371	-.198
Std. Error of Skewness	.251	.309	.414
Kurtosis	-.388	-.387	-.193
Std. Error of Kurtosis	.498	.608	.809

**Table 5: Descriptive statistics, skewness and kurtosis for some investigated variables – Municipalities with at least two schools**

	N	Mean	25 % quartile	Median	75% quartile	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Schools 2002-03	396	7.79	3	6	9	6.80	0.123	66.70	0.245
Pupils 20002-03	396	1497.1	348	691	1510	9.19	0.123	110.00	0.245
Average school size 2002-03	396	151.6	89.5	134	205.0	0.89	0.123	0.61	0.245
Resources per pupil 2002-03	396	98.7	84.7	95	109.4	1.23	0.123	1.94	0.245
% change in total number of pupils from 2002-03 to 2005-06	396	-0.92	-4.3	-0.267	2.64	-2.37	0.123	21.31	0.245
% change in total number of schools from 2002-03 to 2005-06	396	-3.94	0	0.000	0	-2.36	0.123	6.43	0.245
% change in average school size from 2002-03 to 2005-06	396	4.41	-2.8	1.070	6.05	2.72	0.123	10.45	0.245
% change in average resources per pupil from 2002-03 to 2005-06	396	2.09	-3.5	2.026	6.88	1.43	0.123	8.36	0.245

**Table 6: Descriptive statistics, skewness and kurtosis for some investigated variables – Municipalities with at least two schools and the same number of schools in 2002-03 and 2005-06**

	N	Mean	25 % quartile	Median	75% quartile	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Schools 2002-03	302	6.35	3	5	8	3.63	0.14	20.59	0.28
Pupils 20002-03	302	1163.3	332.8	646	1333	5.63	0.14	44.68	0.28
Average school size 2002-03	302	154.2	92.1	138.8	207.1	0.88	0.14	0.80	0.28
Resources per pupil 2002-03	302	98.6	84.8	95.0	107.0	1.15	0.14	1.78	0.28
% change in total number of pupils from 2002-03 to 2005-06	302	-0.53	-4.1502	-0.1083	2.7812	-0.06	0.14	2.23	0.28
% change in average school size from 2002-03 to 2005-06	302	-0.53	-4.1502	-0.1083	2.7812	-0.06	0.14	2.23	0.28
% change in average resources per pupil from 2002-03 to 2005-06	302	2.66	-3.0557	2.3135	7.2764	1.78	0.14	9.42	0.28

**Table 7: Descriptive statistics, skewness and kurtosis for some investigated variables. Municipalities with at least 10 schools.**

	N	Mean	25 % quartile	Median	75% quartile	Skewness		Kurtosis	
		Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
skoler02	92	18.0	11	13	18.75	4.595	0.251	25.652	0.498
elever02	92	4290.5	1734.5	2748	4125.75	5.127	0.251	31.703	0.498
skolestr02	92	207.9	135.0	203.1	267.8184	0.316	0.251	-0.724	0.498
alle timer/alle elever	92	84.8	77.14	83.49	89.6584	0.933	0.251	0.778	0.498
Present endrelev 0205		1.24	-0.57	1.08	3.3071	0.351	0.251	0.751	0.498
Present endrskoler 0205	92	-3.73	-6.16	0	0	-1.369	0.251	2.129	0.498
Present endrskolestr 0205	92	6.03	0.098	2.79	10.8019	1.561	0.251	2.617	0.498
Present endress 0205	92	2.11	-2.644	2.15	5.9155	0.354	0.251	0.457	0.498
Gini 02	92	0.0785	0.0650	0.0800	0.0921	0.152	0.251	-0.388	0.498
Gini 05	92	0.0739	0.0575	0.0707	0.0867	0.777	0.251	0.44	0.498
% change in Gini from 02-03 to 05-06		.0046	-.0070	.0041	.0166	-.122	.251	.738	.498

**Table 8: Descriptive statistics, skewness and kurtosis for some investigated variables. Survey sample, municipalities interviewed.**

	N	Mean	25 % quartile	Median	75% quartile	Skewness		Kurtosis	
		Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Schools 2002-03	49	17.1	11	13	17	4.185	0.34	21.359	0.668
Pupils 20002-03	49	3736.5	2068	2668	3922	5.193	0.34	31.345	0.668
Average school size 2002-03	49	208.6	142.2	221.6	253.9	-0.107	0.34	-0.724	0.668
Resources per pupil 2002-03	49	83.4	78.0	82.2	87.6	0.932	0.34	0.72	0.668
% change in total number of pupils from 2002-03 to 2005-06	49	1.59	-0.055	1.09	3.24	0.577	0.34	1.471	0.668
% change in total number of schools from 2002-03 to 2005-06	49	-3.93	-7.67	0	0	-1.041	0.34	1.363	0.668
% change in average school size from 2002-03 to 2005-06	49	6.83	-0.295	2.79	11.68	1.334	0.34	1.736	0.668
% change in average resources per pupil from 2002-03 to 2005-06	49	2.56	-2.245	2.55	7.12	0.115	0.34	0.298	0.668
Gini 0203	49	0.0753	0.0590	0.0728	0.0915	0.413	0.34	-0.338	0.668
Gini 0506	49	0.0721	0.0553	0.0709	0.0843	0.969	0.34	1.245	0.668
% change in Gini from 02-03 to 05-06	49	.0031	-.0102	.0023	.0165	-.300	.340	.973	.668
Years since model were put into use (1 missing)	37	2.03	1	2	2.5	1.395	0.388	4.298	0.759

**Table 9: Descriptive statistics, skewness and kurtosis for some investigated variables. Survey sample, municipalities not interviewed.**

	N	Mean	25 % quartile	Median	75% quartile	Skewness		Kurtosis	
		Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Schools 2002-03	43	4919.98	1386	2882	5319	4.420	0.361	22.96	0.709
Pupils 20002-03	43	19.19	11	13	19	4.448	0.361	23.32	0.709
Average school size 2002-03	43	203.70	122.62	184.83	295.50	0.486	0.361	-0.967	0.709
Resources per pupil 2002-03	43	86.47	76.90	86.92	93.21	0.843	0.361	0.606	0.709
% change in total number of pupils from 2002-03 to 2005-06	43	0.84	-2.39	1.07	3.46	0.158	0.361	0.106	0.709
% change in total number of schools from 2002-03 to 2005-06	43	-3.49	-5.56	0.00	0.00	-2.020	0.361	4.065	0.709
% change in average school size from 2002-03 to 2005-06	43	5.12	0.459	2.78	6.92	1.899	0.361	4.274	0.709
% change in average resources per pupil from 2002-03 to 2005-06	43	1.60	-3.0696	1.29	5.34	0.663	0.361	1.085	0.709
Gini 0203	43	0.0823	0.0707	0.0827	0.0927	-0.069	0.361	0.035	0.709
% change in Gini from 02-03 to 05-06	43	0.0064	-0.0047	0.0051	0.0178	0.175	0.361	0.401	0.709
% change in Gini from 02-03 to 05-06	43	.0064	-.0047	.0051	.0178	.175	.361	.401	.709

**Table 10: Comparison between municipalities interviewed and not interviewed**

	Descriptive statistics			Test statistics, comparison of means municipalities interviewed – not interviewed			
	Municipalities with at least 10 schools	Interviewed municipalities	Municipalities not interviewed	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
N	92	49	43				
<b>Gini-coefficient 2002-03</b>							
Mean	0.0786	0.0747	.0823	826	2051	-1.78	0.075
Median	0.0800	0.0728	.0827				
25 quartile	0.0650	0.0590	.0707				
75 quartile	0.0921	0.0895	.0927				
<b>Schools 2002-03</b>							
Mean	18.0	21.7	19.2	1030.5	2255.5	-0.181	0.856
Median	13.0	14.0	13.0				
25 quartile	11.0	11.0	11.0				
75 quartile	18.8	22.3	19.0				
<b>Pupils 2002-03</b>							
Mean	4290	3671	4920	971	1917	-0.646	0.519
Median	2748	2667	2882				
25 quartile	1735	1905	1386				
75 quartile	4126	3731	5319				
<b>Average school size</b>							
Mean	207.9	211.7	203.7	941	1887	-0.88	0.379
Median	203.1	221.7	184.8				
25 quartile	135.0	142.2	122.6				
75 quartile	267.8	253.9	295.5				
<b>Resources per pupil 2002-03</b>							
Mean	84.8	83.6	86.5	883	2108	-1.334	0.182
Median	83.5	82.2	86.9				
25 quartile	77.1	77.1	76.9				
75 quartile	89.7	87.6	93.2				



## **Appendix 2: The interview guide**

### **Questions concerning municipal resource allocation to schools and possible changes in the model for such resource allocation.**

#### Information that is necessary in case I have to call again for supplementary information

Name of municipality.....

Name of the person being interviewed.....  
(In case I have to make additional calls.)

Position.....

Length of time in the position? .....

#### Questions:

1. In what way does the municipality distribute resources among the schools?  
(Below you will find questions in which I ask you to be a bit more specific when explaining how a possible model is constructed.)
  - a. By way of a mathematical model?
  - b. By negotiating about changes in relation to last year's accounts, budget, and changes in the number of pupils and pupils' needs.
2. Has the municipality made any changes in the way it distributes resources to schools or changed model in the last few years? (Yes/no?)
  - If no,
    - 4.1 If possible, for how long do you reckon the model has stayed unaltered?
    - 4.2 Have they considered changing the model?
  - If yes,
    - 4.3 What was the reason for the change in model?
3. Has the changed model been put into use? (Yes/no/partly?)
4. When was the model put into use?
5. If a new model has not been put into use or only partly been put into use:
  - 7.1 What is the reason for the fact that the model has not been put into use?
  - 7.2 When will it perhaps be put into use?

6. How does the municipality distribute its resources to the school, then and now? I want to find out whether the various resources are distributed according to a mathematical model with fixed criteria, empirical figures, or to a greater extent discretionary, i.e. based on judgment. Relatively detailed description of the model is desired even though the main point is to obtain information about which distribution criteria are used as the most important one(s). For example, find out whether the old class division rules are used, or the total number of pupils, or distribution according to levels or grade 1 – 4, 5 – 7, 8 - 10, or other groupings are used. ++ Auxiliary forms to make sure I catch all pieces of information:

	Distribution method now	Previous model, if any
How are the resources distributed to the schools? - Also, find out whether the total amount of resources is distributed according to the same criteria, or different criteria are used for different types of expenditures		
If resources are distributed according to different criteria for different types of expenditures <ul style="list-style-type: none"> <li>- Teacher labour costs/teacher hours to schools are distributed</li> <li>- Resources to running expenses such as school material, administrative expenses such as offices, office staff, telephones, postage, other operating expenses are distributed</li> <li>- Resources to buildings and maintenance expenses are distributed (if such resources are distributed to the schools)</li> </ul>		

*In order to check whether the total amount of resources is distributed according to the present resource allocation model as described above:*

7. Are there any assessments based on discretion/judgment in the distribution of resources to the schools? (Yes/no?)
- If yes:
- 9.1 Give an estimate of the share of the school's resources, which is distributed on the basis of discretion (per cent).
8. Did the introduction of the new model result in resistance or any kind of "noise"? (alternatively, if a new model was to be introduced, would that lead to any resistance/"noise") By whom, if any?
9. Have the schools in the municipality fully delegated budget responsibility (for example, can wages be "traded in" for material or things)? (Yes/No)

## **Essay 4:**

# **Reforms and use of management control systems in schools**

*In recent years public schools in Norway have experienced changes such as local school management and devolved budgeting, new class-size regulations and nationwide skill tests. The purposes of this explorative case study are to study the design and use of management control systems in these schools and how the New Public Management (NPM) inspired changes have influenced the systems. Anthony's classical framework of the management control process and the concept of loose coupling are used to describe and analyse the schools' management control systems. In contrast to previous research on the public sector in Norway, the study indicates a tight coupling between budgets and accounting and reporting at a school level. However, this coupling between budgets and accounting is not linked to the operational activities or performance measures, but only focuses on the total spending level. Thus, the change from input control to output control, i.e. increased flexibility on input combined with new nationwide tests, has little or no effect on the internal control systems. Previous research has also deemed Norway to be hesitant to NPM-inspired reforms. While that study focused on the central authority level, the present study identifies hesitation on the local school level and thereby extends the impression of Norway as a hesitant reformer.*

## **Introduction**

Organisations use management accounting and control systems in order to make decisions to achieve overall organisational goals, to draw attention to factors, behaviours and/or processes of importance for goal achievement, to ensure that the organisational objectives are achieved (Horngren et al., 2003, p840) and to “assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization’s objectives” (Anthony, 1965, p17).

Management control is defined as “the process by which managers influence other members of the organization to implement the organization’s strategies” (Anthony & Govindarajan, 2001, p7), and management control systems are defined as “the formal, information based routines and procedures managers use to maintain and alter patterns in organizational activities” (Simons, 1995a, p5). Management control systems include controls such as personal and clan control as well as management accounting systems (Chenhall, 2003). Management accounting is defined as “measures and reports, financial and non-financial information that help managers make decisions to fulfil the goals of an organization” (Horngren et al., 2003, p840) with a focus on internal reporting (ibit), while management accounting systems refer to systematic use of management accounting practices such as budgeting and product costing in order to achieve organisational goals (Chenhall, 2003).

Results from research on school production and school productivity (e.g. Hanushek, 1981, 1986; Hanushek, 1997, 2002) and international comparisons of pupils’ school results and school expenditures per pupil (OECD, 2004, 2007) indicate differences with regard to school productivity between schools and countries. To stimulate school efficiency and effectiveness, New Public Management (NPM) inspired reforms, such as free school choice, devolved financial management and a larger focus on school output control, have been proposed or implemented in education around the world.

In Norway, primary and lower secondary schools are owned by the municipalities, and the schools are controlled by the local municipality as well as by central school authorities in the shape of regulations given by the Government and the Ministry of

Education. In recent years the schools have been exposed to reforms intended to facilitate school efficiency and effectiveness (UFD, 2003b). Former rigid class-size regulations have been removed from the Norwegian Education Act (1998), the Ministry of Education has introduced a national school quality control system and many local school authorities have replaced detailed line-item budgeting by devolved financial management in schools.

It is reasonable to assume that these changes may make new or altered demands on a school's internal management accounting and control systems. In addition, it would seem that, in order to achieve the intended effects of the changes, there should be couplings between different elements in the schools internal management accounting and control system. However, neither school economics research nor management accounting research has paid any significant attention to how schools manage and control their internal activities and resources, i.e. how schools' internal management accounting and control systems are designed and used (essay 1). Therefore, knowledge is limited whether there are couplings between the elements in schools' management accounting and control systems and whether these systems are designed and used in a way that might facilitate achievement of the intended effects of the reforms, and consequently whether the intended effects of reforms with regard to school productivity are achieved.

This lack of knowledge, combined with the recent changes from input control to output control in Norwegian schools, has spurred an interest in studying management accounting and control in Norwegian schools. Thus, the objective of this study is to investigate the design and use of management accounting and control systems in Norwegian public schools.

Management control systems might include management accounting systems as well as other types of control (Chenhall, 2003). This study focuses on management accounting and control systems, but for the reason of simplicity, "management control systems" is used synonymously with "management accounting and control systems". In order to investigate what kind of management control systems the schools have and use, the study focuses on formal routines, procedures, measures, reports and information used by manager(s) to make decisions that contribute to achieving the

goals of schools. The study concentrates on how such systems are used internally, although the information may also be provided for external purposes or stakeholders.

The theoretical framework for the study is presented in the next section.

Methodological issues and the chosen method, a case study, are discussed in the third section. In addition, the third section includes a presentation of the schools selected for the study and some of the external conditions under which the schools operate.

The findings from the case study are discussed in section four. The fifth section sums up the study and includes some proposals for further research.

## **The analytical framework**

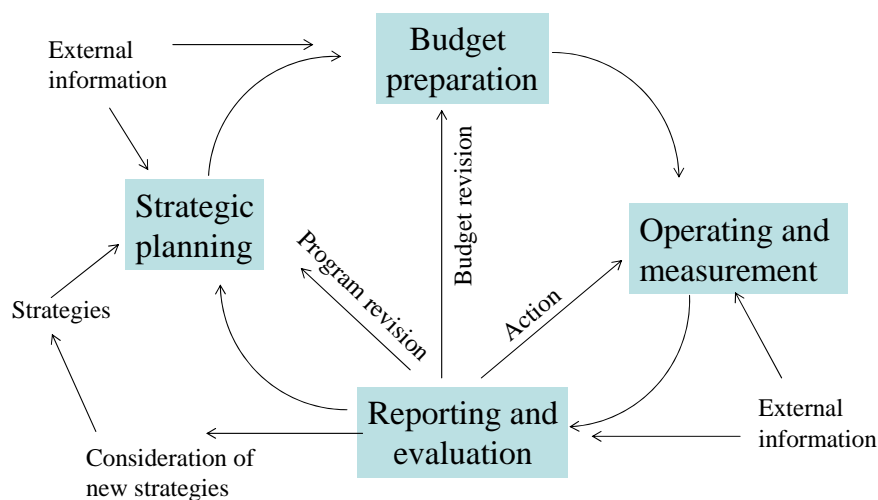
In this paper, the management control process (Anthony & Young, 2003) is used as a framework to describe and analyse the design of the management control systems in schools. This normative management control theory can be interpreted as if the process to be managed is like a machine where the output-input ratio reflects the efficiency of the process and where efficiency presupposes couplings between the different phases in the management control process and knowledge about how to increase efficiency. However, the process may also be interpreted as a means to control or balance different interests or tensions in the organisation.

While Anthony's management control process presupposes couplings between the different phases, others have argued that decoupling or loose couplings and the use of management control systems to buffer external control and for legitimating purposes may be rational for some kinds of organisations (Brunsson, 1989). The management control process and the concept of loose couplings are discussed below.

### ***The management control process***

Anthony and Young (2003) describe management control as a continuous process with four main phases following each other sequentially. The four phases are the strategic planning phase, the budget preparation phase, the operating and measurement phase and the reporting and evaluation phase. The process is often illustrated as in the figure below.

Figure 1: Phases in the management control process (Anthony & Young, 2003)



The management control process is associated with budgeting, accounting and annual reporting procedures. Although these system elements are used as the main examples in illustrations of the process, the process may contain other routines, procedures or elements. For instance, there are multi-dimensional management control systems such as the Balanced Scorecard (Anthony & Govindarajan, 2001). The Balanced Scorecard is mentioned in connection with the operating control phase (Anthony & Young, 2003), but it is also used to make the organisation's goals more specific, to develop the strategies, plans and initiatives to be followed to achieve the goals, and to measure goal achievement (Kaplan & Norton, 2004).

The process may also constitute a framework for analyses of both short-term and long-term control processes, as well as analyses of continuous or "ad hoc" management control processes. However, as long as budgeting, accounting and annual reporting are frequently used to illustrate the process, it is natural to relate the process to the accounting year.

*Strategic planning* is the phase in which the goals of the organisation are developed and decided, and in which the strategies necessary to achieve the goals are decided (Anthony, 1990). Strategic planning is a long-term process, and during this process implicit or explicit contracts are developed. These contracts specify "what the organization plans to deliver to each stakeholder group in return for its participation and contributions in helping the organization achieve its primary objectives"

(Atkinson, Banker, Kaplan & Young, 1997). Strategic planning is also described as a means to improve communication and achieve agreements about objectives and plans (Anthony & Govindarajan, 2001).

The first step in the strategic planning process is to identify what the owners expect from the organisation (Atkinson et al., 1997), the organisation's long-term, broad, overall goals and strategies. In non-profit organisations, the overall goal may be to provide the best possible services with the available funding, and in the strategy formulation process the goals of the organisation are usually taken for granted (Anthony & Govindarajan, 2001). The goals or "the owners' expectations" of public services may be stated in object clauses as in the Norwegian Education Act (1998), or expressed by the Government, the municipal council or other stakeholders. These expectations have to become the primary objectives of the organisation (Atkinson et al., 1997). However, the expectations, and consequently the objectives, of the organisation may be ambiguous and, for this reason, difficult to realise.

The second step is to choose the strategies to achieve the goals (Atkinson et al., 1997). In the strategic planning phase, decisions are made concerning the major programmes for future periods and the expenses the programs will incur (Anthony & Govindarajan, 2001). The process may imply preparation of a strategic plan containing budgeted costs and revenues for the different programmes for some future years (Anthony & Young, 2003). The plan reflects priorities and demands (Atkinson et al., 1997), and typically covers a period of five future years (Anthony & Govindarajan, 2001).

According to Anthony and Govindarajan's (2001) view, the senior management is the main participant in the strategic planning process, and managers of individual departments do not usually participate in the strategic planning process. However, the need for a strategic plan may differ between organisations and over time. Anthony and Govindarajan (2001) argue that a formal strategic plan is desirable in organisations where the top management is convinced that strategic planning is important, if the organisation is relatively large and complex and if there is considerable uncertainty about the future and the organisation has the flexibility to adjust to changed circumstances. Consequently, a "formal strategic planning process



is not needed in small, relatively stable organizations, and it is not worthwhile in organizations that cannot make reliable estimates about the future or in organizations whose senior management prefers not to manage in this fashion.” (Anthony & Govindarajan, 2001).

The next phase in the management control process is the *budget preparation phase*. The purpose of this phase is “to fine-tune the strategic plan, to help coordinate the activities of the several parts of the organization, to assign responsibility to managers, to authorize the amounts they are permitted to spend, to inform them what performances are expected of them, and to obtain a commitment as basis for evaluation of the manager’s actual performance” (Anthony & Govindarajan, 2001, p471).

A budget is a plan for expected revenues and expenses or costs in the next period of time, often the next year. In the budgeting process the levels of most committed costs are determined (Atkinson et al., 1997). The budget has traditionally been a central part of an organisation’s management accounting control systems, and “it is one of the few techniques capable of integrating the whole gamut of organizational activity into a single coherent summary” (Otley, 1999, p370). In the budget preparation process, the organisation’s activities are coordinated and potential problems may be identified and solved (Horngren et al., 2003).

In the budgeting process, plans and strategies from the strategic planning phase are converted into responsibility terms (Anthony & Young, 2003). The budget preparation process may also include negotiations between responsibility centre managers and their superiors, and the resulting budget is a bilateral commitment (Anthony & Young, 2003). The budget then reflects the organisation’s goals and how they are to be achieved, and it is also a means to communicate the organisation’s short-term goals to its members (Hansen & Van der Stede, 2004; Horngren et al., 2003).

The budget preparation process may be a “top down” process or a “bottom up” process (Anthony & Govindarajan, 2001). A “top down” budgeting process implies that the manager(s) set the budgets for the lower levels. In a “bottom up” process, the

lower level managers participate in setting the budget amounts. An advantage of the bottom up process is that budget participation may have some positive effects on managerial motivation. It is likely that the budgetary goals are accepted to a larger extent if the lower level managers feel that they to some extent control the goals. In addition, there may be some advantages with respect to information exchange when lower level managers participate in the budget preparation process (Anthony & Govindarajan, 2001; Demski, 1994). One of the disadvantages is that this bottom up process may also leave room for budgetary slack or amounts that are not in line with the company's overall objectives (Anthony & Govindarajan, 2001). Anthony and Govindarajan recommend that the budget process combine the two approaches.

The third phase in the management control process is the *operating and measurement phase*. In this phase, ongoing operational activities are supervised and information about resource usage and performances are recorded. Operational control includes financial control and performance control.

Financial control is about having appropriate accounting systems and other management control systems. These systems make sure that expenditures are recorded on the right accounts and with the right amounts, that the expenditures do not exceed the amounts granted to the various objectives and that the funds are spent as intended. Internal and external auditing may also be parts of the financial control (Anthony & Young, 2003)

Performance control is about a manager's control over the day-to-day operations in their organisations, and about measuring and reporting non-financial performance. Performance control is related to task control: "the rules, procedures, forms and other devices that govern the performance of specific tasks to assure that they are carried out effectively and efficiently" (Anthony & Young, 2003, p679). Performance control is also about controlling the effort and performance of individual employees or groups of employees. If poor performance or possible budget overruns are revealed in this phase, such information may result in adjustments of the goals, the strategic plan, the budget and/or the operational activities.

The *reporting and evaluation phase* is the last phase in the management control process. In the reporting and evaluation phase, accounting information and a variety of other information are analysed and reported. The information provided by the reports is used for three purposes: to help coordination and control of current operations, for performance evaluation and for programme evaluation (Anthony & Young, 2003). The results of the reporting and evaluation phase are then input into revisions of the strategic plan and the budget, or in modification of operations. The results from this phase may also lead to a revision of the overall goals of the organisation (Anthony & Young, 2003).

*External information* adds to the internal management control information in all phases. External information is important both with respect to strategic planning and budgeting, as well as concerning whether and how operations are to be altered and how performance measures and reports are to be presented and interpreted.

### ***Use of management control systems***

In the normative approach, it is presupposed that the different phases of the management control process are coupled and take place one after the other. It is also assumed that the operational activities and the reporting and evaluation of the results in the next round influence a new or revised plan or budget. A coupled management control process is a means to control efficiency and is useful as a process to handle or balance different internal or external stakeholders' interests. However, there are discussions in the management accounting and control literature concerning decoupling or loose coupling in the management control process as means to protect internal activities from external control, to provide different stakeholders with results according to their demands and for legitimating purposes (Brunsson, 1989; Collier, 2001; Edwards et al., 2000; Edwards et al., 1995).

In a discussion of loose coupling, Orton and Weick (1990) define tightly coupled systems as systems "portrayed as having responsive components that do not act independently" (Orton & Weick, 1990, p205). Similarly, they describe loosely coupled systems as systems "having independent components that do not act responsively". Loose coupling is also defined in this way: "Loose coupling is evident

when elements affect each other “suddenly (rather than continuously), occasionally (rather than constantly), negligibly (rather than significantly), indirectly (rather than directly) and eventually (rather than immediately)” (Weick, 1982, p308).

Furthermore, they mention non-coupled or decoupled systems as situations where there is responsiveness without distinctiveness, which may be interpreted as a situation where a change in one system element does not necessarily result in any response in the other system element(s).

Brunson (1989) proposes decoupling as a rational solution for political organisations – organisations facing inconsistent norms and a variety of demands and expectations. In such organisations, different individuals or groups have different norms and ideologies and the organisations use “talk”, “decisions” and “actions” to meet the varying demands and to win support and legitimacy from their surroundings. “Talk”, “decisions” and “actions” are described as three types of organisational output. “Talk” is an ideological output reflecting ideas, visions or political statements produced for both internal and external purposes. “Decisions” is a form of talk, but is considered important enough to be classified as a separate kind of organisational output. “Actions” is related to the physical products or services provided by the organisation. Strategic planning is interpreted as “talk”, budgeting is often categorized as “decisions” and the accounts are assumed to reflect “actions” (Høgheim et al., 1989; Pettersen, 1995).

Høgheim et al. (1989) use these interpretations of “talk” and “actions” when studying the budgeting process in a large Norwegian municipality. They found that accounting information had little influence on the budgeting process, and that the budget had little influence on the operational activities. The budget was based on last year’s budget, although the accounting report showed large budget overruns the last year and the operational activities were not reduced or altered to match the budgeted expenditures. They reached the conclusion that there were “elusive or loose couplings” between the operational activities and the budget preparation and planning phases. Planning and budgeting, and action and reporting, were categorised as “the two worlds of management accounting”. Pettersen (1995) used the same interpretations of “talk” and “actions”, and she found a similar lack of coupling between budget and accounting in

Norwegian hospitals. Another study indicates that couplings may differ depending on the organisational level (Nyland & Pettersen, 2004)

Some researchers have studied the implementation of devolved financial management in three English Local Education Authorities. They found that internal systems of budgetary control were used for external legitimacy rather than internal control, and that strategic planning was decoupled from budgeting (Edwards et al., 2000). They also found that the introduction of local management of schools and devolved budgeting had a limited impact upon the schools' activities (Edwards et al., 1995), that the budget remained uncoupled from the operational activities and their quality (Edwards et al., 1995) and that the schools established "absorbing groups" to protect the core activities from the effects of the changes (Broadbent & Laughlin, 1998; Laughlin et al., 1994). In addition, the way the changes were handled seemed to be dependent on the schools' financial situation and the "type of schools", whether the school headmasters were "safe hands", "active managers" or "crisis managers" (Edwards et al., 2000).

All the studies mentioned above are non-longitudinal field studies not focusing on whether couplings existed before the introduction of the changes. In a longitudinal study of the introduction of devolved financial responsibility in a police force, Collier (2001) found that the introduction of devolved financial management had facilitated couplings between accountability and operational activities.

Researchers have not only found that decoupling or loose coupling exists, but have also discussed why a lack of couplings occurs or exists and under what conditions loose coupling or decoupling is "appropriate" or rational. Brunsson's (1989) view that decoupling may be a rational solution for political organisations facing inconsistent norms and demands has already been mentioned. Further examples include an exploratory study by Johnsen (1999), in which he studies the implementation of performance measurement in local governments and proposes that decoupling of performance indicators and organisational objectives enhance successful implementation of performance measures. Another researcher suggests, when discussing the results of a study, that decoupling between decisions (budgets) and actions may give the organisation a certain degree of freedom (Pettersen, 1995). This

freedom may provide an opportunity to achieve the goals that are perceived to be essential by the professional staff, and to maintain or achieve a state of asymmetric information and slack as well.

This study concentrates on schools' management control system (MCS) by using the management control process to describe what kind of MCS elements the schools have, how the MCS elements are used and whether and how the different elements are coupled. Whether or not the coupling may differ according to organisational level is not an issue in this study. In relation to management control, it is of interest in schools to study couplings between the different phases and elements in the management control process.

## **The empirical study**

### ***Method***

Various research strategies are possible when empirically investigating the design and use of management control systems in schools. Some of these are: experiments, quasi-experiments, survey studies, archival analysis, history studies, case studies and literature analysis (Ryan et al., 2002; Yin, 1994). The lack of secondary data and other publicly available information about management control processes and systems in schools makes archival and historical analysis impossible. Experiments and quasi-experiments are considered unrealistic as long as the main purpose of the study is to describe what management control systems the schools have and to understand how they are used, rather than to test casual relationships. The lack of prior studies of management control systems in schools excludes the possibility of literature analysis. Two feasible research methods are thus left: case studies or survey studies.

Case studies have some advantages as regards understanding processes and causal relationships. Case studies may provide information to help answer both "how" and "why" research questions, while survey studies do not have the same advantages with respect to "why" research questions (Yin, 1994). Due to the possibility of a larger sample, a survey study has advantages with respect to external validity, but may have some limitations with respect to internal and construct validity. On the other hand,

case studies may be limited in terms of external validity, but have advantages in terms of internal and construct validity (Modell, 2003b). However, case studies look for theoretical generalisations, i.e. they “attempt to generalize theories so that they explain the observations that have been made” (Scapens & Bromwich, 2001, p149), rather than statistical generalisations, i.e. “statistical occurrence in a particular population” (Scapens & Bromwich, 2001, p149).

Due to the fact that little is known about management control systems in schools, and based on the view that management accounting systems are socially constructed and may differ according to social structures and day-to-day social actions (Ryan et al., 2002), a case study seems to be an appropriate research strategy. A case study may give a greater understanding of management control systems, system elements, couplings between elements and possible cause and effect relationships than other types of studies. A case study could also reveal issues that may not have been thought of without this “close to the actual situation” study, and it may give an improved understanding of how the organisational environments affect the design and use of the management control systems.

The present study might be characterised as a descriptive/explorative case study (Ryan et al., 2002) and could also be described as a theory refining case study (Keating, 1995). Eisenhardt’s (1989) process that is intended to be followed in theory-building case studies has guided the present study, but her recommendations have not been followed in detail.

### ***The interview guide and the interviews***

In interviews, the interviewee’s beliefs about what the interviewer expects may affect the answers (Skjervheim, 1960). It is probably impossible to avoid the effects of this completely, but it is necessary to think about this when formulating the questions and guiding instructions for the interviews. In order to diminish these effects and to give the interviewee the possibility to mention issues of interest to himself / herself in the study, the interview guide was designed with relatively open questions, especially in the beginning of a new sequence of questions. If the interviewees did not mention issues of interest by themselves, more precise or leading questions were asked. The

interview guide contains the questions, some information to be read to the headmasters as an introduction to the questions and some “reminders” for the researcher.<sup>1</sup>

The interview guide has five main sequences of questions. The first sequence contains questions to confirm that information about the particular schools collected from different websites is correct, and one question related to the school’s organisational structure. The second to fourth sequences of questions are related to the phases in the management control process, i.e. the school’s goals and visions, school level planning and budgeting and operational control, measuring, reporting and evaluation. Finally, some questions were asked about the local municipality’s introduction of devolved financial management, the annual agreement between the particular headmaster and his/her superior and the removal of the class-size regulations from the Educational Act.

The interviews were recorded and notes were written during the interviews. In one of the interviews, the last one, the recording failed. The results presented below are thus based on three recorded interviews and notes from the fourth. The interviewee from the local school authorities was interviewed twice by telephone. These interviews were not recorded.

### ***The case schools***

Assuming that Simons (1995a) is correct when he presumes that larger organisations have more complex management control systems than smaller organisations, large schools are preferred in this study. Also, assuming that organisations with several and/or complex tasks need more complex management control systems, the schools should preferably have some complexity with regard to their tasks. For instance, it is reasonable to assume that pupils with special needs due to disabilities or having Norwegian as a second language might make additional demands on schools’ internal management accounting and control systems. Information about the proportion of pupils with special needs for any of these reasons is not public. Therefore, one school

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<sup>1</sup> The interview guide is enclosed in appendix 1.



teaching a group of pupils with heavy disabilities and two schools located in areas assumed to have pupils with Norwegian as their second language have been chosen for this study.

Whether the schools' management control systems vary because of different external conditions and regulations is not an issue in this study. In order to avoid the effects of different external conditions and regulations, the schools are selected from the same municipality. Based on the assumption that similar schools operating under the same, relatively stable external conditions have similar management control systems, the case study was limited to four schools: two primary schools (1<sup>st</sup>-7<sup>th</sup> grades) and two lower secondary schools (8<sup>th</sup>-10<sup>th</sup> grades). Provisions were made to increase the number of schools if the interviews revealed great variations in the design and use of management control systems. However, this was not necessary.

The schools' headmasters were interviewed. In addition, information was collected from the schools' websites, from other websites and from documents received directly from the headmasters and the local school authorities. The documents included plans of actions, accounting reports and the agreements between the headmasters and the local school authorities. The interviews with the headmasters were semi-structured and an interview guide was prepared. One person from the local school authorities was interviewed about the formula funding system and other local conditions under which the schools are operating. No interview guide was prepared for those interviews.

The four schools selected for the case study have about 500 pupils and are considered to be large schools in Norway. The schools' total budgets vary from 18.1 million to 27.9 million NOK. Each of the schools is managed by the headmaster. In all the schools the headmaster, the second masters and other employees responsible for different departments or tasks constitute a management team. In addition, the schools have one or several administrative employees, including an accountant.

**Table 1: Selected data for the four schools**

<b>2004</b>	<b>1st primary school</b>	<b>2. Primary school</b>	<b>1st Lower secondary school,</b>	<b>2nd lower secondary school</b>
Grades	1. - 7.	1. - 7.	8. - 10.	8.- 10.
Pupils	467	519	503	516
Teachers, man-labour years	36.0	30.4	50.3	41.3
Administrative staff, man-labour years	4.9	4.0	5.78	6.1
Other,	9.0	2.9	3.2	2.2
Budget Mill. NOK	27.7	22.3	31.0	31.2
Budget surplus 1000 NOK	355	814	1 045	777

The headmasters in the lower secondary schools have been headmasters for several years. In the primary schools, one of the headmasters came to the school one year ago. He had previously been headmaster at another school. In the other primary school, the headmaster is also new in the position, but he has been a second master at the same school for several years.

The four schools have organised the teachers, pupils and teaching activities differently. The two primary schools divide the pupils into classes following the old rules, while the two secondary schools have recently changed the way they organise the pupils and the teaching activities. One of these schools has divided the pupils in each grade into two groups, or “bases”, with approximately 90 pupils in each group. A group of teachers are linked to the different bases and they only teach pupils in that “base”. The pupils in each base are divided into smaller groups for shorter or longer periods of time. The pupils in each base are also divided into “basic groups” of about 15 pupils with one responsible “contact teacher”. The contact teacher is responsible for following up his/her pupils and contact with their parents. The remaining secondary school is organised in a similar way. In this school, the three grade levels are organised as three “internal schools” with one “head teacher” managing the teachers and teaching in each grade. The pupils at this school are organised in classes, and the classes cooperate closely two by two. Also, at this school the teachers teach pupils only at one grade level. The secondary school buildings are relatively new or newly renovated and the buildings have the required facilities to organise the teaching in groups of different sizes.

All the schools have a local school board. The board members are representatives of the teachers, other employees, the parents and the pupils. In addition, one political representative is a member of the board. The board has neither legal nor financial responsibility, but the headmasters in this study give their boards an orientation about the financial situation in every meeting.

### ***The schools' external operational conditions***

The Norwegian public schools are owned by the local municipalities, but regulations given by the Norwegian Parliament, the Ministry of Education and the Norwegian Education Act (1998) constitute the main conditions under which the schools and local school authorities operate. In addition, the different municipalities decide whether the schools are managed by line item budgets or by devolved financial management, as well as other local conditions controlled by the local municipality.

The municipality in this study introduced devolved financial management a few years ago. The schools receive a lump sum budget from the local school authorities and may allocate their budgets according to their own preferences and local needs, provided that the schools follow the Education Act and regulations given by the central and local authorities. The chief administrative officer<sup>2</sup> is the headmasters' principal, and the headmasters report to the chief school manager in the chief administrative officer's staff.

The total budget for an individual school is the sum of different cost estimates calculated by the local school authorities. The teacher wage expenditures are calculated based on the previous class-size regulations. Teacher hours<sup>3</sup> necessary to teach the classes, additional teacher hours to teach pupils with special needs and other extra teacher hours are converted into teacher man-labour years and multiplied by the actual teachers' annual wage and social costs. For vacant posts, the schools receive an average wage and social costs. The other expenditures are calculated based on prior

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<sup>2</sup> Deputy mayor who is in charge of administration and who prepares budget proposals.

<sup>3</sup> In the teachers' tariff agreement, it is stated how many hours a week (and year) a teacher has to teach pupils. For instance, in primary schools a teacher man-year is estimated to be 25.3 teacher hours a week (960 teacher hours a year). The agreement also states how the remaining hours are to be used.

expenditures or standards. Although the schools are free to allocate their total funding according to their own priorities, the various expenditure estimates are made known to the schools as part of the process. If a school spends less than its total budget limit, 90% of the surplus is transferred to the school's budget for the next accounting year and 10% is transferred to a municipal fund. If the school overruns its budget limit, 100% of the deficit is transferred to the next year.

Every year an agreement is made between the individual headmaster and the chief school manager. This contract includes some goals that are common to all schools in the municipality and some that are specific to the school or headmaster. The contracts are followed up in meetings during the year. At the end of the year, the headmasters have to prepare a report to the local school authorities summing up their goal achievements. The report is discussed with the chief school manager and an agreement for the next year is prepared.

The Ministry of Education has introduced nationwide skill tests in reading, writing, mathematics and English to be answered by the pupils in grades 4, 7 and 10 and a questionnaire to be answered by the pupils in grades 7 and 10 each year. The results from the tests and the questionnaire, as well as marks based on class work and final examinations in the 10<sup>th</sup> grade, are published on a common website.<sup>4</sup>

## **Empirical findings**

The first parts of this section describe and discuss the schools' management control systems according to the phases in the management control process. In section 4.4 the couplings, or lack of couplings, between the elements in the management control systems are summed up and discussed in light of normative theory and prior empirical studies. Section 4.5 is a discussion of the hesitation and resistance of the schools to some of the recent reforms.

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<sup>4</sup> [www.skoleporten.no](http://www.skoleporten.no).

## **Goals and visions**

Norwegian schools share the same objectives that are stated in the objects clause in the Norwegian Education Act and in the national curriculum prepared by the Ministry of Education. In recent years the Ministry of Education has focused especially on reading, writing, mathematics and English.

The objectives formulated at the municipal level are presented to the schools in contracts between the headmasters and the local school authorities. Examples of common objectives are that the schools have to focus on reading, writing and mathematics, document an individual pupil's progress, focus on how the pupils are divided into groups and make sure that the pupils are actively involved in the teaching activities. Examples of school-specific objectives are that the school has to prepare a plan for the allocation of the last year's budget surplus and that the school has to cooperate with a neighbouring school.

In addition to central and local goals, the four schools have developed their own visions with the main emphasis on the well being, learning and play of pupils, and the idea that each individual pupil, parent and/or employee is appreciated and taken care of. The schools' visions are: *1) (the school) – is open for everybody and has an eye for the individual: diversity, mastering and fun; 2) Well being and learning for everyone; 3) Children, parents and employees are appreciated and taken care of. We have nice environments that encourage indoor and outdoor playing and activities; 4) We notice you.*

The schools' visions have different origin and the schools have different routines for evaluating and altering the visions. In one of the lower secondary schools the vision was developed as a consequence of a period of uproars 10-12 years ago. The vision has now been unchanged for several years and there are no plan to alter it. In the other lower secondary school the vision was formulated when the school changed its teaching model. In this school the vision is evaluated and possibly revised every year. In one of the primary schools the headmaster expressed some lack of "ownership" to the vision because it was decided before he was engaged at the school. This headmaster has started a process to revise the vision. In the remaining school the

vision was proposed by the parents and accepted by the employees. This vision has been unchanged for some years. The visions were communicated to employees, pupils and parents during the process leading up to their adoption, and are later communicated to pupils, parents and other stakeholders on the school websites and in various written information material.

### ***Planning and budgeting***

Three of the headmasters reported a plan of actions. The plans include objectives and statements about how to achieve their goals. Two of the plans also include statements of how to measure goal achievements. All three plans contain objectives related to reading, writing and mathematics. In addition, one of the plans includes goals related to the school library and the pupils' council. Another plan mentions goals related to the school library, pedagogical methods, various learning arenas and physical training. The third plan involves developing the school's teaching model and cooperation between the school and the parents. Two of the headmasters, one at each level, said that the plan is revised every year and prepared for the next four years. In both of these schools the revision is carried through by a committee. Other employees take part in the discussion of goal achievements and goals for the next period of time, and in the lower secondary school the parents' and pupils' councils are also involved.

All of the headmasters reported about their annual budgeting, but one of the primary school headmasters does not prepare his own budget. He uses the estimates calculated by the local school authorities as the school's budget, but he mentioned that he makes some "mental reallocations". He knows that some of the expenditures are estimated too high and some too low. For instance, he knows that he can use money "budgeted" for cleaning to pay substitute teachers. In the three schools preparing their own budgets, this is done mainly by the headmasters and the school accountants. The budget preparation is based on information about the number of pupils in the different grades, changes in pupils' special needs, changes in the number of pupils with special needs, last years accounts, the calculations made by the local school authorities and central and local goals and regulations.

The headmasters are responsible for and decide the budget, but they all discuss the budget estimates with the employees and the board before the budgeting process is finalised and the budget sent to the local school authorities. The headmasters were presented with three budgeting process descriptions (cf. appendix 1). When asked about which description matches their own process, all the headmasters pointed out the description classified as diagnostic.

The budget may be revised during the year, either as a consequence of a change in the total budget limit due to a change in the number of pupils, or because of other changes during the year. Budget revisions are prepared by the headmaster and reported to the local school authorities in the monthly accounting reports.

None of the headmasters prepare budgets for a longer period of time than one year. However, some of them reported a list of planned investments, in prioritised order, for the next years.

At the beginning of the school year the headmasters have to report to a central school information system (GSI<sup>5</sup>) on how they plan to use the available teacher hours on different purposes during the school year. The number of hours may be interpreted as an hour budget, and the headmasters were asked whether they use these numbers internally. They all replied that reporting these numbers is a job that had to be done and nothing else. During the school year they pay no attention to the numbers and they are not bound by the reported allocation of teacher hours. One of the headmasters expressed it in this way: *“I did not use them (the GSI numbers) at all. To me it is only a burden”*. He also said that the specifications of the numbers to be reported do not match the way the teaching is organised in his school. He has to adjust his numbers to the reporting formula.

### **Incremental budgeting**

When the headmasters spoke about their budgeting process, they used the term “operating expenditure” when they referred to school material, the library and other non-wage expenditures. They told in detail how these operating expenditures are further allocated to subjects, the library and various other purposes. The four

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<sup>5</sup> [www.wis.no/gsi](http://www.wis.no/gsi).

headmasters involve the teachers who are responsible for specific subjects and collections in the allocation of the operating expenditures. Contrary to the detailed allocation of “operating expenditures”, the headmasters conveyed little about the allocation of teacher wage expenditures for various subjects, classes or tasks, although one of them said that he discusses the allocation of teacher hours with the teachers. Instead of budgeting wage expenditures for different purposes, only the total wage expenditure is shown in the budget, and the allocation of the available teacher hours is determined in the time scheduling process. In the two lower secondary schools the headmasters allocate teacher hours to each grade or base. How the hours are further allocated to different purposes is determined within each grade or base. In the other two schools, the headmaster is responsible for the detailed allocation of teacher hours.

The way that the headmasters reported their budgeting process and the allocation of teacher hours indicates that the budgeting process is mainly incremental. Budgeting is referred to as routine work and the headmasters know from experience where the money is going to be spent. Great changes in the different budget items from one year to the next seem to be rare. However, some incremental reallocations between budget items take place or are discussed. For instance, one of the headmasters reported that it may be possible to move the teachers’ representatives to agree to, for instance, buying PCs for the teachers on the expenses of the number of teachers employed (teacher hours). Another headmaster stated that, *“Reallocation between the different expenditures is not discussed, but there is some discussion about the allocation between assistants and teachers – it is about the number of adults relative to pupils”*.

The distinction headmasters made between wage expenditures and “operating expenditures” may indicate that they consider wage expenditures as almost fixed. Wage expenditures are highly prioritised, and reducing these to increase other expenditures is avoided if possible. One of the headmasters said: *“Generally speaking, more teachers are needed so it is not fun to cut back on the teacher resources. We try to avoid it unless we are forced to do it; like we were the last year to avoid a new budget deficit”*. However, some discussions of how to allocate the teacher hours take place.



### **Attitudes to budgeting**

Some differences were revealed in whether the headmasters feel free to allocate the total resources according to their schools' priorities. Three headmasters expressed that most of the budget is tied up in teacher wages and other expenditures outside their control. They seem to perceive the budgeting process as more or less limited to a discussion of how to allocate the estimated amounts to cover school materials, cleaning and maintenance. They express a feeling that there is little flexibility in the budgeting process. Concerning control in the budgeting process and the wage expenditure, one of headmasters said: *"Yes, there is a lot we have little control of. The main part is, after all, spent on wages"*. And later, about involving teachers and other employees, he continued: *"I would like to involve as many as possible, but it would be very complicated. After all, it is not that much money we are talking about. As I said before, we can only control the use of the relatively small amount estimated for operative expenses"*.

The fourth headmaster expressed another approach to the budgeting process. He referred to the situation some years ago when the school had to handle some upheaval, and said: *"... in that situation we said, we have the money that allows us to do what we want to do. Maybe we do not have money for the 5<sup>th</sup>, 6<sup>th</sup> or 7<sup>th</sup> wish on our list, but we have enough money for what we think are important"*. This attitude also seemed to be present when he told about the budget preparation process in general. When he spoke about this, he said that he first secures money for some projects for pupils removed from the ordinary classes because they cause severe interruptions. In contrast to the other headmasters, he includes the wage expenditures when talking about budgeting. This was the same headmaster who reported that it is possible to discuss with the staff and their labour union representatives in order to reduce the numbers of teachers (teacher hours) and prioritise IT equipment, for instance. In addition, he expresses a more proactive attitude to some of the expenditures that the other headmasters seem to consider as fixed. For instance, he has reduced the cleaning expenditures by using pupils to clean the blackboard and carry out the garbage every afternoon.

At the end of the interview, the headmasters were asked whether introduction of devolved financial management and the removal of the class-size regulations have affected management accounting and control in their schools. To some extent the answers to this question reveal a duality in the opinions of the headmasters about their possibility to manage the school resources according to their local demands. Some of the headmasters pointed to the freedom to manage the resources by themselves, but as one of them expressed it, *“the introduction of local school management has led to additional tasks and more responsibility, but little freedom of action”*. Another headmaster answered the question in this way: *“I think it is much more interesting, much more exciting, but also much more demanding to be a headmaster after the changes. Previously we had no responsibility for the budgeted wages, now we can manage the different items. I think financial responsibility is exciting in itself”*; and also said that, *“Hours and minutes are counted much more than before, but we try to do it with sense. We don’t use any kind of clocking-in. However, some may wish clocking-in to make visible when they are here and what they are doing, but we have no such systems”*. Some of the headmasters also mention that working with the local school management has resulted in less time for pedagogical leadership.

## ***Operational control, reporting and evaluation***

### **Tight financial control**

The schools have identical systems, decided by the municipality, for financial control. Accounting takes place in the schools, and every month an accounting report is signed by the individual headmaster and sent to the local school authorities. The financial situation is followed up closely by the accountants and the headmasters. One of the headmasters spoke about weekly meetings between him and the accountant to check the present financial situation. School material expenditures seem to receive the most attention. In two schools the teachers responsible for collections and subjects are instructed to keep some kind of “shadow accounts” to control their part of school material expenditures.

The headmasters were asked to read three descriptions of the use of budget and accounting information similar to the descriptions of the budgeting process (cf.

appendix 1). All the headmasters stated that the description illustrating diagnostic use of accounting information was the best match to their practice.

### **Management by trust and exceptions**

In the normative theory of the management control process, it is assumed that output measurement and evaluation facilitate productivity by making the individual employees, and the organisation as such, able to learn how to increase productivity, to direct attention towards activities that enhance productivity and to take necessary action to increase productivity. Assuming that school productivity is a matter of the learning and maturation of pupils in relation to the use of input resources, management control systems would presumably focus on the progress of pupils in these areas and the utilisation of input resources.

In view of the fact that man labour years (or hours) are the main input factor in the schools, you would expect that some attention would be paid to the utilisation of available time. However, none of these schools has introduced time registration systems to ensure that the pupils are taught the number of hours decided by law and regulations, or to control the teachers' use of time. One of the lower secondary school headmasters answered the question about output control with the phrase, "*It is about trust*". He added that, given the new way the teaching activities are organised, it is more difficult for the teachers to shirk. The teachers are working more closely together than previously, when the teachers went into their classrooms, closed the door and nobody outside the door knew what was going on inside. He also mentioned that this new teaching model made it much easier for the headmaster to walk around and listen to and talk with both pupils and teachers.

When it comes to controlling the learning and maturation of pupils, one of the primary school headmasters told that his school has developed a system to follow up with the pupils individually. The pupils have to answer diagnostic tests in each grade. Every pupil's results and their progress are controlled by a "coordination team". The headmaster, the second master, the social teacher and the teacher responsible for the pupils with special needs are members of the team. If one pupil's progress is not as expected, the team contacts the actual teacher(s) and discusses and decides how to follow up with that pupil. One of the lower secondary school headmasters reported

that he checks the pupils' marks at the end of each term. If something irregular is detected, he will contact the actual teacher to discuss reasons and possible actions. This headmaster is not the one that expressed the most proactive attitude to budgeting. The other two headmasters did not mention similar or other systems or routines used to control the pupils' progress,

Although all the schools have to carry out the nationwide skill tests, none of the headmasters have used the results from these tests internally. The headmasters also stated that they have not applied the results from the common nationwide questionnaire to the pupils. However, they all reported that they plan to use the results from the next common questionnaire. They also said that the schools carry out their own small-scale questionnaires, mainly focusing on bullying, once or several times a year. The results from these studies are discussed in teacher meetings, in the board and with the parents.

Both the headmaster who screens the term marks and the school that checks up on the pupils' progress make this to ensure that the progress is "*as expected*". The headmaster who screens term marks also said that poor learning or other school quality problems are mainly detected, if ever, by complaints from parents, pupils or teachers sensing in their experience that things are not "*as they should be*". The expressions "*as expected*" and "*as they should be*" may be interpreted as kinds of benchmarks, and deviations from these benchmarks may result in actions to improve the situation. This indicates that the schools are mainly managed by exceptions, and alongside this by diagnostic use of formal or informal systems (Simons, 1995a). It seems that this opinion of how it should be, of expected quality, is not only present among the teachers, but also among parents, pupils and other stakeholders. This opinion of school quality may be interpreted as a kind of clan control (Ouchi, 1979) developed through the teachers' common professional background, but also through the parents' and other stakeholders' common schooling.

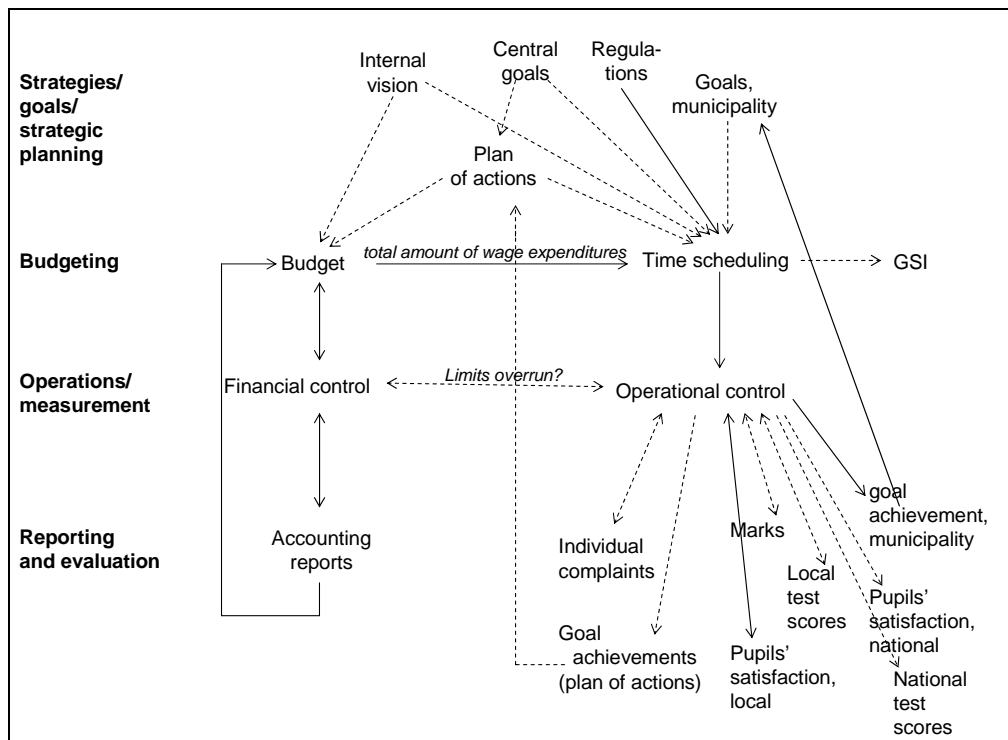
However, one management control system element is used in a more interactive way (Simons, 1995a), i.e. the local questionnaires given to the pupils that mainly focus on bullying. In addition, the extensive involvement of employees in the allocation and control of the school material expenditures indicates a kind of interactive control of

these expenditures. Organisations facing strategic uncertainties are supposed to use management control systems interactively (Simons, 1995a). If it is possible to turn this “upside down”, the way management control systems are used may reveal what the organisations perceive to be of strategic importance. If so, the pupils’ satisfaction with their learning environment, an absence of bullying and how the school material expenditures are allocated can be interpreted as the most important factors that affect the learning and upbringing of pupils. If these factors are the most important, then the use of these management control systems or system elements seems to be rational in order to facilitate efficiency.

### ***Couplings in the management control process***

The figure below illustrates the main management control system elements the schools in this study have and the couplings between them. The arrows indicate how the different elements influence each other. Weick’s (1982) definition of loose coupling denotes that this is evident when elements affect each other suddenly, occasionally, negligibly, indirectly and eventually. Based on this definition, several of the elements in the schools’ management control systems are loosely coupled to each other. The dotted arrows symbolise loose couplings, and the arrows indicate the direction of influence.

Figure 2: The management control process in schools



The main impression from this study is that both the external and internal goals, the plans of actions and the visions are loosely coupled to budgeting, although one headmaster mentioned goals as input information in the budgeting process. In addition, another said the following when speaking about the plan of actions: “and then we take it (the plan) with us when we prepare the budget. Some of the goals we set ourselves are based on the needs we observe, and it is important that the budget allocation supports our progress”. The impression of loose coupling between goals and planning and budgeting is also supported by how another of the headmasters talked about the budgeting process: “It is mainly routine work. Broadly speaking; we know how the money is to be spent”.

Budgets are supposed to affect operational activities through decisions about how the available resources are to be used. The main operational decisions in schools concern how the main input factors, the teachers and other employees, are to be used. However, such decisions are not made in the budgeting process, but take place in the time scheduling process. The only couplings between the budgeting and the operational activities seem to be the fact that the total amount of teacher wage

expenditures and the detailed allocation of the school material expenditures are decided in the budgeting process.

As has already been mentioned, the schools place little importance on performance measurement, and the measures the schools prepare for internal or external purposes do not affect goals, plans, budgets or operational activities. The agreement between the school and the local authorities, and the local questionnaires given to the pupils, are exceptions to this main impression.

### **Couplings between decisions and actions?**

Both Høgheim et al. (1989) and Pettersen (1995) interpret little impact of accounting information on the budget decisions and a large discrepancy between budgeted and accounted costs as loose couplings between “actions” and “decisions”. In the present study, the headmasters reported a minor budget surplus last year and that the last year’s accounting reports constitute important information in the budgeting process, in addition to the number of pupils and their needs. Compared to the criteria used in the two studies referred to above, it is difficult to conclude that there is loose or no coupling between accounting, which is supposed to reflect operational activities, and budgeting, which is supposed to reflect decisions, in the present study.

Although the headmasters spoke about budgeting and accounting reports, you get the impression that the budget is not the main instrument for decisions. Also, accounting is not used to control the operational activities (actions) beyond controlling that the budget limits are not overrun. The headmasters reported a careful process behind the allocation of school material expenditures, but the allocation of teacher wage expenditures or teacher hours to different activities or purposes is not a central issue in the budgeting process. In addition, the wage expenditures seem to be mainly considered as fixed, although one of the headmasters mentioned that it might be possible to discuss increased material expenditures at the expense of wage expenditures, and another mentioned that the number of teachers one year was reduced to cover the previous year’s deficit. Expressions like “*it is routine work*” and the headmasters’ feelings of little or no flexibility in the budgeting process indicate that the budget is hardly used to prioritise based on changes in internal or external demands or goals. Accordingly, it seems that the budget, in these schools, is mainly

used for financial control; to ensure that the various budgeted expenditures are not overrun, and for (external) legitimating purposes. The budget is used to allocate and control the use of money, as if it were a matter of handling “pocket-money”. Similarly, the main purpose of the accounting reports seems to be to control how the “pocket-money” is used, and that the budget limits are not overrun. In the present study then, budgeting and accounting is coupled, but the coupled budgeting and accounting systems are only loosely coupled to the main operational decisions and the day-to-day operational activities.

Brunsson (1989) argues that “talk”, “decisions” and “actions” are different organisational outcomes satisfying different demands or expectations to political organisations. In this study, coupled budgeting and accounting systems are decoupled from decisions and control of operational activities, i.e. the actions. This renders it possible to propose that the coupled budgeting and accounting systems in these schools are, or belong to, a fourth kind of organisational outcome, a kind of outcome made out to meet the municipality’s demand for financial control.

### **Loose couplings to buffer external control?**

The study disclosed a loose coupling between the financial control system and the operational control systems, a loose coupling between evaluation and operational activities and planning and budgeting, and little or no internal use of the various performance indicators demanded by central authorities. This triggers two questions: why is there a loose coupling between the financial management control system and the operational activities? And why do the schools pay so little attention to the performance measures they have to prepare?

“Different costs for different purposes” is a well-known phrase to management accountants. Similarly, different management control systems may be used for different purposes, or the same systems may be used in different ways (Simons, 1995a). A possible interpretation of the headmasters’ use or non-use of the budgets, accounting reports and other system elements is that they use the systems that they have to prepare for external purposes only as long as they are perceived as appropriate. Other internal systems are used when such systems are perceived to be more appropriate. Traditionally schools have used teacher hours rather than wage



expenditures when allocating the total teacher resources to different purposes. In addition, allocating the teacher resources takes place mainly during the summer, before the new school year starts. This may explain why time scheduling is not mentioned as a part of the budgeting process. In addition, some kind of local systems (Jönsson & Grönlund, 1988) are used in the two secondary schools, where the allocation and control of teachers' time are delegated to the "bases" or the head teachers.

Another possible interpretation of the loose coupling between budgeting and accounting and the operational activities, and the decoupling between the performance measures and planning and operational activities, is that the teachers, and possibly also the headmasters, may have different goals than the local and central authorities. The teachers and headmasters may perceive themselves as intermediates between the pupils and their principals outside the schools. In order to escape from this situation, they may choose sides or evolve their own role in the organisation (Brunsson, 1989). The headmasters' argument that the national tests measure only some of the schools' results, that the tests do not measure learning and the focus schools give to the pupils' well being may all indicate that such different norms or objectives exist. By trying to decouple the output controls required by external authorities from the core operational activities, the school headmasters and employees do what is expected of them and at the same time protect their own norms and objectives, as well as the internal activities, from external influence. Decoupling or loose coupling may thus be used to buffer external control (Broadbent & Laughlin, 1998; Laughlin et al., 1994). The headmasters' confidence in a teacher's job performance may be interpreted as a kind of clan control (Ouchi, 1979), or as a way of using professional norms to protect core school activities from external control.

Using loose coupling or decoupling to build a buffer between the external stakeholders and the internal activities may provide the internal actors with a certain degree of freedom, but also offers them opportunities to maintain or increase informational asymmetry and, with that, opportunities to maintain or increase internal slack.

### ***Hesitant reformers?***

Norway has been categorised as hesitant to New Public Management inspired reforms (Mellempvik & Pettersen, 1998). Mellomvik and Pettersen found that the central authorities were hesitant to NPM inspired reforms that were proposed by lower organisational levels. In the present study, both central and local authorities have introduced New Public Management inspired reforms, but the schools, the lowest organisational level, are hesitant or even resistant to both external and internal use of the reforms.

When asked about internal use of results from the nationwide skill tests and questionnaires, all the headmasters argued strongly against the skill tests and especially against the publication of the results on the web. They maintained that the tests only measure skill level, not learning, that the tests only measure some of the schools' characteristics, not all of them, and that the results are not comparable between schools. With respect to comparability, one headmaster said: *"In some schools they exclude all pupils receiving additional teacher resources regardless of reason. Other schools allow some pupils with special needs to participate and others do not. I cannot understand that the test results can be comparable at all"*. Another argument against the tests was that controlling the test scores is time consuming, and consequently expensive, compared to the internal educational advantages of the tests.

The headmasters' arguments against nationwide tests and their non-use of the results from both the tests and the nationwide questionnaire indicate hesitation or even resistance to the reforms. Other signs of hesitation to reforms are the facts that three of the four headmasters also expressed an expectant attitude towards the possibilities of changing the way they allocate the budget to different purposes, and that the two primary schools and one of the lower secondary schools still organise the pupils in classes according to the old class-size regulations. According to the headmasters, the reasons why pupils are still organised in classes are that the buildings mostly have traditional classrooms and that the pupils need to belong to a stable group. In addition, one of the headmasters also mentioned that they *"want to hurry slowly and learn from others' experiences"* before changing their own organisation.

Mellomvik and Pettersen (1998) discuss four possible reasons for hesitation. The last element in their first argument, that there is no strong financial crisis, is probably applicable to the four schools in this study. One of the headmasters expressed it in this way: *“As long as we gain a budget surplus we cannot say it is totally bad, but in public sector there will never be plenty of money”*. Another admitted that the schools in this municipality are far better off than schools in other municipalities. Mellemvik and Pettersen’s fourth argument, that there may be a mismatch between international ideas with an origin in public sector problems and the understanding of how the Norwegian public sector functions, may also explain why the schools argue against the tests and use neither the test results nor the results from the questionnaire. The school reforms are inspired by international comparisons, for instance the PISA report (OECD, 2004), and it is possible that the central decisions are based on a different understanding of schooling and everyday life in schools than the generally-accepted view at the school level.

An alternative interpretation of the hesitation or resistance to the reforms is that the test results and the answers to the questionnaire may reduce the information asymmetry between the schools and their principals, and thus reduce the possibility to shirk, maintain or achieve slack. A reduced information gap may be undesirable for the teachers and their labour union.

Using teacher hours instead of money to control the teaching activities may also be interpreted as hesitation or resistance to change. Using teacher hours as input measures has a long tradition in schools. Before local management in schools was introduced, the schools usually received a number of teacher hours plus a sum of money to be spent on school materials from the municipality. This system is in a way maintained in the municipality’s budget allocation formula. It is possible that using teacher hours to manage the main input factor is rational. It is simple to understand and well known by both teachers and the school administration. However, it is also possible that using hours instead of monetary terms to measure the main input resource is more difficult to interpret by individuals not familiar with the schools’ traditions. This may, in turn, facilitate informational asymmetry between internal and external stakeholders. Using teacher hours instead of wage expenditures may also veil

the marginal alternative costs when deciding the budget allocation, preventing optimal resource allocation and possibly also causing informational asymmetry.

The resistance to the performance measures, the hesitation to use the flexibility provided by devolved financial management, the removal of the class-size regulations, the use of teacher hours for control purposes and the strong focus on some resources and results together render it possible to ask whether the hesitation is caused by headmasters and teachers following their own opportunistic goals. Do they want the relationship between input and output to be unknown to external stakeholders to secure the possibilities of internal budgetary slack (x-inefficiency)?

The hesitation of schools and headmasters to reforms and organisational changes might alternatively be interpreted as slow response and rational behaviour. In recent years, Norwegian schools have been exposed to a range of pedagogical reforms in addition to the reforms discussed in this essay. It might be that headmasters, as well as other school employees, have experienced that slow response to reforms might show that the changes are unnecessary due to a new reform. Consequently, to respond slowly to the implementation of changes might be rational and possibly prevent unnecessary changes and use of scarce resources, thereby possibly facilitating long-term school efficiency. One of the headmasters' answers to a question with regard to changes in the class structure in a way expresses this slow response attitude, when he said, "*we want to hurry slowly and learn from others' experiences*".

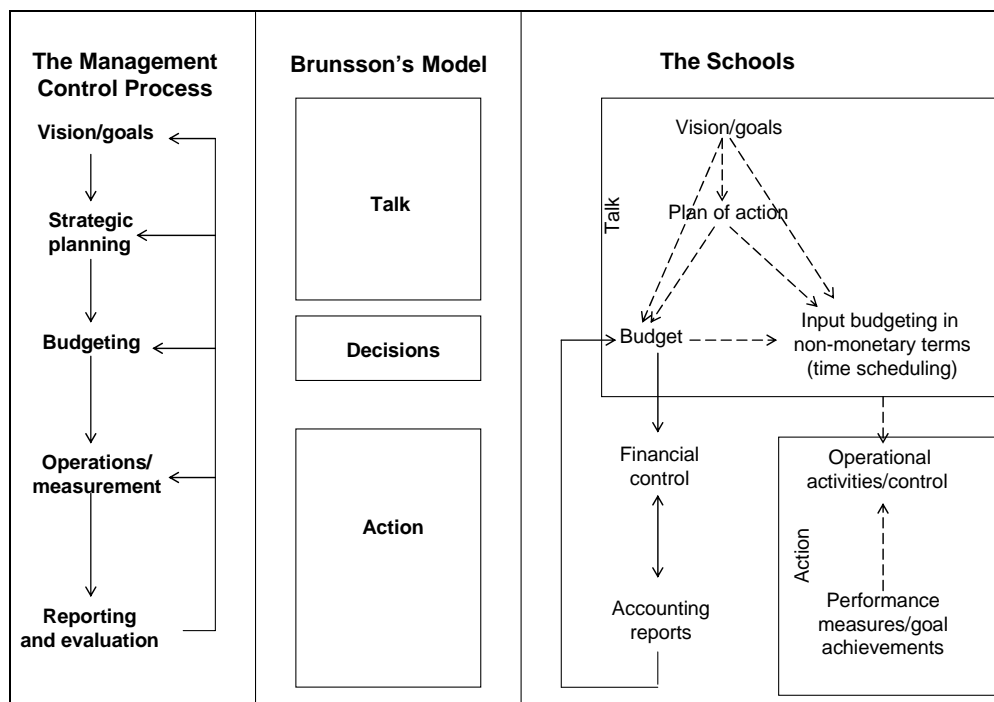
## **Conclusions and proposals for further research**

The normative rationale behind replacing external input control by external objectives and output control is probably as follows: the changes are expected to encourage the schools to find, by themselves, the best, most productive, way to utilise the available resources, and the reforms are expected to facilitate efficient production and increase school productivity. Such effects of the reforms may depend on a coupled management control process, a process in which performance measurement and evaluation of prior results are used to adjust internal goals, planning, budgeting and/or operational activities in order to increase future performances. However, such

couplings do not exist in the schools in the present study. In this study, budgeting and accounting are coupled, but budgeting and accounting are only loosely coupled to the operational decisions and activities, and the performance measures introduced by the central government are neither coupled to the operational activities nor to planning and budgeting.

Figure 3 shows a comparison between the couplings in Anthony's management control process, the decoupling between talk, decisions and actions according to Brunsson (1989), and a simplified illustration of the couplings, or lack of couplings, in the four schools' management control systems. Dotted arrows indicate loose couplings, while continuous arrows indicate tighter couplings.

**Figure 3. Couplings in management control processes**



The figure illustrates one of the present study's theoretical contributions. Researchers studying the public sector in Norway have interpreted budgeting as "decisions" and accounting as "actions". Great differences between budgeted and actual expenditures are interpreted as a loose coupling between decisions and actions (Høgheim et al., 1989; Pettersen, 1995). In the present study, the budgeted and accounted expenditures are nearly equal. According to prior research, this should be interpreted as tight

coupling between decisions and actions. However, in this study you can hardly make this interpretation. As opposed to Høgheim et al.'s (1989) and Pettersen's (1995) interpretations, this study finds that important operational decisions are not decided in the budgeting process and that the coupled budgeting and accounting system is loosely coupled to operational decisions and actions.

The other theoretical contribution is related to the view of Norway as a hesitant reformer. Mellemvik and Pettersen (1998) found that the central authorities were hesitant to New Public Management inspired reforms initiated by lower organisational levels. The present study finds hesitation to NPM inspired reforms introduced by central and local authorities on the lowest organisational level. The schools are hesitant regarding internal use of the performance measures introduced by the central authorities. The fact that several of the headmasters seems to perceive wage expenditures as fixed, that they feel there is little flexibility in the budgeting process and that three of the four schools still use classes as the main organisational unit all indicate hesitation to the changes. In addition, all four headmasters expressed resistance to the external use of the performance measures.

Both the lack of tight couplings in the management control process and the hesitation to changes indicate that the reforms have had little effect on the schools' management control systems. In addition, if the expected effects of the reforms are dependent on the use of the elements in a coupled management control system, the findings from this study indicate that the lack of operational control and performance measurement, the lack of couplings in the management control system and the hesitation and resistance to change prevent achievement of the intended effects: increased school efficiency. Consequently, this study proposes that achieving increased performances through reduction in input control and introduction of output control may be difficult in organisations that are hesitant to change and have decoupled or loosely coupled management control systems.

In a longitudinal study in a police force, Collier (2001) found that the introduction of devolved financial responsibility strengthened the couplings between budgeting and operational activities; the couplings changed from no couplings to loose couplings. The reforms discussed in this paper are recent reforms. In some years, it may be of

interest to repeat the present study to investigate whether couplings have changed, whether the schools have introduced other management control systems, whether they use the systems in different ways and whether hesitation or resistance have diminished.

Case studies have limitations with respect to external validity. The schools in this study are few and they have been selected from the same municipality. Maybe the management control system is designed and used differently in other schools in the same or other municipalities. It might be interesting to investigate whether the coupling between budget and accounting and the loose coupling to operational decisions and actions are common in other schools, as well as in other public organisations. Such investigations, either as case studies in other schools and municipalities or as survey studies, might constitute another interesting direction for future research.

The different perceptions of flexibility in the budgeting process by the headmasters may also be an issue for future research. It may be of interest to study both why headmasters perceive differently the possibility of them affecting the resource allocation, and whether the different perceptions affect the budget allocations, use of management control systems and school efficiency.

The lack of systematic evaluation of the pupils' performance in some of the four schools also points to future research issues. It is probably most interesting to investigate whether tighter couplings in the management control process affect the pupils' performance and, subsequently, school efficiency because of the systematic evaluations of the pupils' performances and use of the results to adjust goals, resource allocation and operational activities. The primary school headmaster, who undertook systematic evaluation of particular pupils' progress, claimed that this evaluation was the reason why his school achieved the municipality's best results on the nationwide tests. This is at least a thought-provoking hypothesis. It may be interesting to discuss whether it is possible to construct "measures" that typify the schools' management control systems, and to find out how these are used to test whether different attitudes to or usage of such systems affect learning and school efficiency.

## **Appendix 1: Interview guide for interview with the headmasters:**

*(Comments in italics are reminders to myself.)*

### **Introduction**

*Begin the interview by thanking the headmasters for setting time aside for me. Matters to be addressed:*

1. Working title, dissertation: Management accounting and control in Norwegian primary and lower secondary schools
2. Research on management accounting and control systems in schools is limited.
3. The limited research has spurred an interest in whether and how headmasters use information, systems, procedures, plans, reports and so to control their schools.
4. The main objective of this interview is to gather knowledge about these issues.
5. The actual headmaster, school and municipality, as well as the individual headmaster's answers will be published in anonymised form.

### **Opening questions, background information**

6. How long have you been headmaster of this school?
7. How large is the school's budget, and what expenses are covered by the budget? Is the budget for a financial year or a school year?
8. Could you tell us briefly about the school's organisation?
  - a. Are there any subordinate managers?
  - b. What kind of responsibilities do they have? Financial, human resource...?
  - c. Who do you, the headmaster, report to?
  - d. Could you tell me a little about the local school board's function?

### **The school's main objectives:**

9. What is this school's main vision (objective)?
10. What is the source of the vision? Who is involved in formulating the school's vision? How did you reach a conclusion concerning the vision? (Who takes part in the discussion?)
  - a. How often are the vision and/or objectives reviewed and possibly revised?
  - b. Does it ever occur that the vision and/or objectives are revised "without waiting its turn"? What may cause this kind of revision? In



that case, who is involved in the decision about revision?

11. In what way are the objectives communicated, and to whom?

If we suppose that the school makes use of input factors such as teachers, text books, equipment etc. in order to offer various activities and services to the pupils and their parents or guardians, which in turn will lead to a result for the pupil in the shape of learning, attitudes, well-being

12. Are the current main objectives at this school related to resource application (input factors), activities, and/or results? If so, which/how?

*Ask for documents, if any.*

## **Planning and budgeting: Long/short-term plans and budgets**

**(Stage 1 and 2 in the management control process – the “talk” dimension)**

Now I am interested in if and how the schools work out long-term and short-term plans and budgets. I am interested in who takes part in the planning, what kind of information is used in the planning and how plans/budgets are used.

### ***What is being worked out and how often:***

13. What kind of short-term and long-term plans and budgets are worked out by the school?

*(For example: Long-term budget/financial plan, annual budget, teacher hour/activity budget, (GSI<sup>6</sup>), ...)*

14. How often are the plans/budgets worked out?

a. How is the work with plans and budgets distributed throughout the year?

15. Who takes part in planning and budgeting, and in what way are other employees or groups of employees involved?

a. At which stages in the process are the various actors or groups of actors involved?

16. Why do the various actors or groups of actors take part in planning and/or budgeting?

17. What is the headmaster’s role in the planning/budget process?

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<sup>6</sup> Translator’s note: GSI is an acronym for “Grunnskolen informasjonssystem”, which is an information system for primary and secondary education in Norway.

18. If there are any disagreements in the process, how do you reach a conclusion as to what is valid in the plan/budget?
19. Does it ever occur that the budget and/or other plans are changed/revised during their assigned time period? Why? Who takes part in this?

### **About the planning process:**

20. What kind of information is used in the planning/drawing up a budget?
  - a. *Are there informal sources of information or formal information sources such as documents or reports?*
  - b. *What types of information, reports and the like, make the basis for which plans/budgets?*
  - c. *Is planning/budgeting based on plans/budgets from previous years? To what extent?*
  - d. *Do budgets and other plans take the school's objectives (strategy) as their starting point? To what extent?*
  - e. *Are reports about the previous period's results or achievements used as information in the budgeting/planning? To what extent?*
  - f. *Are other kinds of information used? To what extent? In that case, what kind of information is used?*
21. How do you start up the budget process, and how do you reach a conclusion as to allocation of the budget to the various expenditure items?
  - a. *Are prioritisation and alternative strategies brought up for serious consideration every time?*
  - b. *Or, is it the case that plans/budgets are mainly based on plans/budgets from last year as well as on accounts and reports from last year, and that changes are made in accordance with discrepancies or experiences from the previous year plus changes in the number of pupils (need)? (Diagnostic budgeting, incremental re-order of priorities)*
  - c. *Or, could it be that budgets are merely technical recalculations of last year's accounts or budgets adjusted according to the expected changes in expenses caused by changes in prices, wage level, teaching staff and number of pupils?*
22. When it comes to budgeting, (possibly man-hour budgeting).
  - a. What services/items do you start with?
  - b. Are there any items of expenditures (or services) that are "given", i.e. that they are not subject for discussion?
  - c. What kind?
23. How much of the budget do you think, roughly estimated, the school can prioritise by itself?
24. You mentioned previously that this school's major objective is:..... To what extent do you think the school's objective(s) are decisive for and reflected in the plans and budgets that are being worked out?

*When the school has both long-term plans/budgets and short-term plans/budgets:*

25. Are there any connections between strategic (long-term) planning and the short-term planning (for example between long-term budget and annual budget), and between various short-term (or long-term) plans? To what extent?
- a. *Are long-term objectives/priorities followed up in the budget/other short-term plans? To what extent?*
  - b. *For example, are there any connections between the GSI and budget? To what extent?*
26. Before we leave the focus on planning and budgeting, I would kindly ask you to decide which one of the following characteristics you think best describes the way the budgeting/planning process takes place at your school. I would also like to discuss with you why you think the various descriptions fit or do not fit.
- a. The budgeting process/planning process at our school is carried out every year with large participation from employees on all levels at this school. The process is a thorough discussion about information from the school's management systems, information from other sources, the school's challenges as well as the objectives and plans we have. Consequently, every year the budget/plans are a result of a thorough and comprehensive discussion and prioritising. The budgeting/planning and the documents, which come out of the process, are considered important to the steering of the school's activities, by colleagues on all levels. (*Description of interactive budgeting, inspired by Abernethy and Brownell (1999).*)
  - b. The school's budget/plans are worked out mainly by the headmaster and the school's administration. Changes that are made are related to last year's budget and/or accounts and are mainly changes brought about by observed discrepancies between the accounts and budget from the previous or preceding periods, by other experiences from the previous or preceding periods, wages, teaching staff and/or number of pupils. Colleagues on other level in this school are only in special cases involved in working out the plans/budget. (*Description of diagnostic budgeting, inspired by Abernethy and Brownell (1999).*)
  - c. The school's budget/plans are worked out mainly by the headmaster and the school's administration. Changes are made in relation to last year's budget and/or accounts and are brought about by changes in prices, wages, teaching staff or number of pupils. Colleagues on other levels at this school are protected against the budget work and are only in special cases involved in working out the plans/budget. The budget is considered as display of expected expenses, primarily worked out because you have to work out a budget and in order to control that you do not overspend the budgeted expenses for the various items. The budget/plans have no connection with the school's objectives and everyday operations for that matter, and no colleagues, outside the administration, are involved in working out the budget/plans.

## About following up operations and reporting/evaluations

(Stage 3 and 4 in the management control process – the "action" dimensions?)

I want to learn a little about how you follow up (control) the way the school's everyday operations take place throughout the year. In other words, how do you know or control whether the activities are on the right track, what tools do you employ, who are involved in the follow-up of the everyday operations and how do you perhaps intervene in order to put things "straight".

27. Could you tell me about how, and who follows up the activities during the year and how you keep yourself informed concerning whether the school's activities are in line with what is desired?

*Additional questions – if necessary:*

28. What kind of information do you use in order to keep yourself informed (control/follow-up) about the operations throughout the year?

- Do you use systematic, formalised information by way of systems and reports or meetings? (What kind of systems/reports).*
- Do you use more informal types of information, which you actively and/or systematically obtain/ask for? (type of information and from whom)*
- Do you use informal, more ad hoc type of information, which others take the initiative to give to you? (type of information and from whom)*

*(Note! Find out whether the information, which is obtained, is of interest, or if one has compared with other schools as well)*

29. How often are the different types of information obtained?

- Do follow-ups/evaluations take place continuously, at certain intervals, or sporadic/if something happens? (For instance: How often do you control the accounts against the budget, get regular feedbacks from teachers about how they are doing in their teaching, or do they contact you only when something is wrong?)*

30. The aids and management systems you use for control purposes, do they focus on control/management of:

- Input:
  - Financial control: Accounting information, comparison with budget, variance analysis?
  - Input volume control: Primarily use teacher hours?
- Activities (control of service productions): That the pupils get the allotted number of hours during the school year, with the correct distribution among the subjects, the 150 hours frame, parents conferences...?
- Results: Marks, national tests, pupils' development and well being? Employees' development/well-being? Other things?
- Results in relation to costs
- Activities in relation to costs?

- f. Activities in relation to results?
31. How do you know whether the school is "on the right track", or perhaps not "on the right track"?
- Do you compare the information with objectives/budget, previous experiences and/or other schools in order to learn whether your school is on the right track,
  - or, by way of informal information channels and intuition/experience?
32. In what way do regulations, plans and budget(s) play a role in management/control of the organisation?
- Are plans/budgets used?
  - Which ones?  
How?
33. Who is involved in following up the organisation throughout the year and in reporting?
- Are the situation/reports discussed with others?*
  - Does this take place on a regular basis, or only when budget/objective variances take place?*
  - In what kind of forum/fora are reports/situations discussed?*
34. If the school's activities/operations are not as desired or planned
- In what way is this kind of situation handled?*
  - Who gets involved?*
35. If we go back to your statement concerning this school's main objective. To what extent do the information you obtain and the reports you use in the management of the school, say something about how the goals have been achieved?
36. Do you see a connection between the school's "everyday life" and what is being reported to superior authorities in the next round (state and local authorities, including Statistics Norway and others)?
- If there is no connections:*
- Could you explain this?*
  - Why is there no connection?*
37. Do you think your school has the necessary and satisfactory systems for follow-up of the achievement of the school's objectives?
- What are you, or the systems, in lack of?
38. I will now read out loud three characteristics about how management systems/reports can be used. I want you to tell me to what extent the situations fit with your school:
- The information from the budget and the accounting system is often and on a regular basis interpreted and discussed, in meeting with different groups of colleagues on all levels. The information and its interpretation are used both in continuous follow-up and adjustment of the everyday

operations and in planning and budgeting, in which colleagues at different levels take part and the information is at the bottom of a thorough discussion and prioritising.

*(Description of interactive use, inspired by Abernethy and Brownell (1999).)*

- b. The information from the budget and accounting system is compared with the objectives that are already determined. The information from the management systems is mainly used by the headmaster in order to control that the activities are in line with the plans. Other parties are only involved if there are any variances between reports/reported information and plans. Changes during the year are only implemented if the information disclose variances and the information about variances is used in the preparation of next year's plans and budgets, first and foremost to make the necessary adjustments to avoid similar variances next year. *(Description of diagnostic use, inspired by Abernethy and Brownell (1999).)*
  
- c. The information from the budget and accounting system is read by the headmaster, who will take this into consideration. If reports from the accounting system show that the budget for a certain area (item) is spent, the employees are informed that the means have been spent and that there is no room for any additional spending on that particular area. Information from the formal management systems are not discussed with other employees. Budgets and plans for the next year are more or less "carbon copies" of corresponding budgets and plans for the present year. They are worked out by the headmaster. The various items are adjusted for any changes in the number of pupils, regulations and the like. Beside this, as little effort as possible is used to work out plans and budgets. *(Indicates that budgets and plans are something you have to work out, but are considered to have little managerial relevance.)*

### ***A few details about reporting to local/central authorities:***

*If this has not emerged during the interview above:*

In recent years the schools have been instructed to carry out a pupil satisfaction inquiry and national skill tests, final assessment and examination marks for 10th grade are reported to central registers and pieces of information is registered in the GSI database and probably in other registers as well.

Are the reports, which the school mail off, used internally at the school as well?

- a. Which reports/what pieces of information are used?
  - b. How/when?
39. Is this type of information about other schools, used as information in processes at this school (benchmarking)?
- c. What reports/what types of information are used
  - d. How/when?

## **Miscellaneous:**

In conclusion I would like to take a closer look at the budget process and the headmaster's role in the process, as well as the headmaster's role as "connecting link" between the municipality and the school's needs.

40. In the public sector it is often the case that the needs are greater than the available budgets:
- a. Do you feel this is also the case for this school?
  - b. How do you communicate that the school has limited resources? Are you taken seriously at the school when you say that there is no more money?
  - c. How are limited resources prioritised? Is it the headmaster's responsibility to limit/prioritise the use of resources, or are decisions made together with colleagues? In other words, do you allow discussions about prioritising concerning "the margin", or do you perhaps protect yourself and others by saying that there is no more money?

During the last few years there have been quite a few changes in the schools. I want to know your opinion whether these changes have brought about any changes in the financial management at your school.

41. Your local school authorities have introduced devolved financial management (financial management at schools). How has this affected the (financial) management systems and routines in your school?
42. Do you feel that you and your school have the necessary leeway when it comes to decide on your own prioritisations?
43. Recently, there was a change made in the Education Act. The amendment removed classes as part of the organisational unit in schools. Has this change resulted in new challenges or changes in the management systems at your school? What kind?
44. I am familiar with the fact that there is an annual contract between municipal unit managers and the municipality:
- b. What is it about?
  - c. Do you take part in this and do you discuss the contents/objectives of the contract)
  - d. Who decide if you disagree?
  - e. What are the consequences if the objectives are not achieved?
  - f. Do you think the annual contract, the way it is now, is OK, or do you think there are some problems linked to the contract that must be (or should be) solved?

45. Is there anything you think is important in relation to the management of the school's activities that I have not asked about? In that case, what?



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