The Impact of School Policy and Stakeholders' Actions on Student Learning: A Longitudinal Study

Abstract

This paper proposes and validates a theoretical framework on how school policy can promote student learning. School policy is considered to have an indirect effect on student achievement by changing school stakeholders' actions toward improving the School Learning Environment (SLE) and teaching practice. A reciprocal relationship between school policy and stakeholders' actions is also considered. A longitudinal study was conducted to test the framework's main assumptions. A stratified sample of 64 primary schools was selected and students' achievement in Mathematics at the beginning of Grade 4 and at the end of the next three consecutive school years was measured, alongside the school policy and teachers' actions with regards to issues associated with teaching and the SLE. The results of Multilevel structural equation modelling analyses supported the main assumptions of the framework. Implications for the development of school policy are drawn and suggestions for further research are provided.

Keywords (5): school policy, stakeholders' actions, school learning environment, quality of teaching, student outcomes

Empirical paper

Introduction

School policy have the potential to influence the actions of teachers and school stakeholders so as to raise student achievement (Leithwood, Steinbach, & Jantzi, 2002; Caldwell, 2003). The main assertion is that policy developed at the school level allows for the development of better and more effective educational processes likely to correspond to local needs (Nir & Ben Ami, 2006). The term *policy* refers to a course or principle of action adopted or proposed by an organization or individual (Cohen & Hill, 2001). From this perspective, schools are expected to propose a set of actions that school stakeholders (e.g., teachers, students, and parents) are expected to follow to promote student learning. This set of actions is captured in official documents published by the school management team to designate roles of different stakeholders in the well-functioning of the school both inside and outside of the classroom. School policy is also reflected in various documents issued periodically by the school management team, such as the minutes of the teaching staff meetings and announcements or

guidelines sent to teachers and/or parents through regular mail or posted on the web (Vitaska, 2008).

Many scholars discuss the importance of establishing effective school policies which may have an effect on improving student learning outcomes (Reynolds et al., 2014; Hattie, 2009). It is argued that responsibility for, and control of, reform efforts should be located at the individual school level. Schools are seen as the "basic unit of change and school educators (teachers and principals) are not only the agents, but also the initiators, designers, and directors of change efforts" (Smith & O'Day, 1991, p. 235). Along the same line of argument, Spillane (2005) argues that local school systems are more than mere implementers of top-down educational policies. Schools should be allowed to respond to national policy initiatives by developing and adopting their own distinct policies. As Tyack and Cuban (1995) pointed out and Flessa (2012) also supported, the literature on policy implementation and on schools as organizations tends to view schools as idiosyncratic places that are more likely to change a reform than be changed by it, using site-level autonomy and discretion to redirect policy goals in unexpected ways. It is also argued that school policies have the potential to influence the actions of teachers and administrators at least as much as policies imposed from above (Leithwood, Steinbach, & Jantzi, 2002). Moreover, it is claimed that school decentralization initiatives increase the flexibility of the schools and allow them to develop school distinct policies which have a better potential to raise student achievement (Caldwell, 2003; Robertson, Wohlstetter, & Mohrman, 1995). The main assertion is that increasing schools' authority and flexibility will allow for the development of better and more effective educational processes which are more likely to correspond to local needs. School stakeholders are better aware of their school needs and may therefore be more able to direct effort, resources, and educational processes more efficiently to meet them (Nir & Ben Ami, 2005).

Despite the importance of policy development at the school level, the overall emphasis in the research literature has been focused on policy-making at the state and national levels (e.g., Cohen & Hill, 2001; Honig, 2006; Spillane, Reiser, & Reimer, 2002; Townsend, 2007). Less is known about the efforts of schools to create and implement policies to support improved student achievement (Datnow, 2006; Duke et al., 2008). As Lashway (2002) argues, much of the available literature consists of policy recommendations and opinions rather than empirical research and findings. The results of two meta-analyses (i.e., Kyriakides, Creemers, Antoniou, & Demetriou, 2010; Scheerens, Seidel, Witziers, Hendriks, & Doornekamp, 2005) reveal that, although schools are expected to develop their own policies to improve the learning environment and teaching practice, school policy was found to have a small direct effect on student achievement. In addition, secondary analyses of PISA studies show that variables measuring school policy do not predict variation in student outcomes (Maslowski, Scheerens, & Luyten, 2007).

This paper argues that there is a need to establish a theoretical framework to understand the impact of school policy on student learning and guide the design of studies intended to investigate its effects. Most studies investigating the relationship between school policy and student achievement are cross-sectional, that is, they collect data at one time-point (Hattie, 2009; Kyriakides et al., 2010). Although such studies were able to identify small correlations between school policy and student achievement, their results may underestimate the impact of school policy on changing the actions of school stakeholders (Conley & Brown, 2003; Land, 2002). Thus, a framework developed to understand the impact of school policy is proposed in the next section. This framework is based not only on educational effectiveness theories (Scheerens, 2013; Creemers & Kyriakides, 2008) but also on the results of empirical studies investigating the impact of school policy on student learning outcomes (e.g., Kyriakides & Creemers, 2012; Lashway, 2002; Lüftenegger et al., 2012). These studies seem

to reveal that school policy has mainly an indirect effect on student achievement through changing the actions that school stakeholders take in order to improve the School Learning Environment (SLE) and the teaching practice. Using this framework, a longitudinal study measuring school policy and teachers' actions over time was conducted. Although the study is concerned with the impact that school policy may have on a specific group of stakeholders (i.e., teachers), the data emerging from this study can help us test two assumptions of this framework. Thus the main results of this study are presented, and suggestions for research to test additional elements of this framework and to investigate the impact of school policy on other groups of stakeholders (e.g., pupils and parents) are provided.

A Theoretical Framework to Explore the Impact of School Policy and Stakeholders' Actions on Student Achievement

In this section, we outline the main assumptions of a theoretical framework developed to explain how and under what conditions school policy may have an impact on student achievement. The first assumption, which is supported by various effectiveness studies (e.g., Reynolds et al., 2014; Teddlie & Reynolds, 2000; Townsend, 2007) posits that there are many factors associated with student achievement which operate at four different levels: the student, classroom, school, and system levels.

Second, the framework places emphasis on two overarching factors concerned with the school policy and the actions taken to improve: (a) teaching and (b) the SLE. The importance of these two overarching factors is emphasized by studies investigating the impact of school factors on student achievement (e.g., Creemers & Kyriakides, 2010; Reynolds et al., 2014). While organizational aspects of schools provide the necessary preconditions for effective teaching, it is the quality of teacher-student interactions that principally determines student progress (Fauth, Decristan, Rieser, Klieme, & Büttner, 2014).

Thus, school policy and stakeholders' actions are expected to have mainly indirect effects on student learning outcomes through improving the quality of teaching at the classroom level and the SLE.

Third, the framework assumes that the impact of school policy depends on the extent to which stakeholders implement the policy guidelines. This is based on research suggesting that viewing implementation failure as a result of poor policy clarity neglects the complexity of human-sense making processes consequential to implementation (Spillane, 2005). For example, a school may develop a clear policy on partnership, which includes the involvement of parents in teaching. However, not all teachers may be persuaded to implement this policy, especially if they believe that parental involvement may jeopardize their professional autonomy (Fan & Chen, 2001). This implies that stakeholders' actions may have a direct impact on improving the SLE and teaching practice, whereas school policy may have an indirect impact by changing stakeholders' actions.

Fourth, it is assumed that there is a reciprocal relationship between school policy and school stakeholders' actions. It is expected that changes in school policy may have an impact on changing the actions of school stakeholders. At the same time, it is also possible that the stakeholders' actions might influence school policies by stressing the need for changing the policy in order to address current stakeholders' needs (Knapp, 1997; Talbert, 2002). To illustrate this reciprocal relationship, consider student absenteeism. A new school leadership team appointed in a school with student absenteeism problems might develop a policy on student absenteeism to ensure that this phenomenon is minimized. This move indicates the direct impact that a change in policy might have on changing stakeholders' actions. In contrast, in schools where the greatest majority of students regularly attend school, there is no need to develop such a policy. This illustrates the effect of the stakeholders' actions on setting or changing school policies. As a whole, this example suggests that cross-sectional

studies cannot help identify such changes as those discussed above, either in school policies or in stakeholders' actions. Longitudinal studies, in contrast, have the potential to empirically test this assumption because they enable tracing changes either in policy or in actions.

Finally, the framework assumes that school policy has a situational effect on student achievement implying that its impact may vary depending on the current situation of the school under investigation (Goodson, McGee, & Cashman, 1989). This situational character of school policy suggests that in developing the school policy, school leaders should take into account the abilities and readiness of those who are expected to implement it (Cohen & Hill, 2001). For example, take a school that originally had no immigrant students from a particular country and had to teach a Geography lesson on that country mainly by using secondary sources of information (e.g., books, internet). When immigrants from that country join the student population, the school can invite the parents of those students to talk about their country.

The proposed framework that encompasses these assumptions is illustrated in Figure 1. This figure demonstrates that the framework is multilevel in nature and refers to factors situated at the school, classroom, and student level. It also supports that quality of teaching at the classroom level has a direct impact on student achievement. Emphasis is placed on the role of school policy in influencing indirectly both teaching and the SLE. Therefore the framework is concerned with the impact that a change in school policy (over a period of time) may have on changing the actions of stakeholders and through that on improving the teaching and the SLE.

Insert Figure 1 about here

Three elements of school policy are considered. First, it is expected that school policy should clarify all stakeholders' role in improving learning (Cohen & Hill, 2001). When the school policy is clear, the stakeholders are more likely to judge its recommendations and decide whether it is worth making the effort to change their actions (Land, 2002). Second, the framework assumes that in introducing a school policy, the skills and the willingness of school stakeholders should be taken into account (Bell & Stevenson, 2006). If a certain policy expects stakeholders to undertake roles they do not have the skills to perform or they strongly oppose to, it is unlikely that the policy will be implemented effectively. The third element of school policy is concerned with the support that school leaders or other members of the school team should provide for stakeholders to help them change their actions (Spillane, 2005; Flessa, 2012). Introducing a policy on teaching and/or the SLE that addresses these three elements is likely to influence stakeholders' actions.

School Policy for Improving Teaching and the School Learning Environment: Defining the Study Constructs

A) School Policy for Improving Teaching

Meta-analyses of factors associated with student achievement show that concepts such as teaching quality, time on task, and opportunity to learn are key factors for explaining variation in student outcomes (Hattie, 2009; Scheerens et al., 2005). Recent theoretical models of educational effectiveness research (e.g., Creemers & Kyriakides, 2008; Scheerens, 2013; Reynolds et al., 2014) refer to factors related to these key concepts at all different levels (i.e., student, classroom, school, and system). Specifically, at the school level, the models of EER investigate aspects of school policy on teaching associated with: (a) the

quantity of teaching, (b) the provision of learning opportunities, and (c) the quality of teaching[1].

School policy on quantity of teaching is mainly concerned with the attempt of the various school stakeholders to make sure that the time allocated for teaching is not lost for any group of students. The importance of this factor is stressed in early models of educational effectiveness (e.g., Carroll, 1963; Creemers, 1994) and meta-analyses of studies demonstrating the impact of this factor on student learning outcomes (e.g., Hattie, 2009; Kyriakides et al., 2010; Scheerens et al., 2005). The second aspect of school policy for teaching is concerned with the learning opportunities that schools offered to their students beyond those included in the official curriculum. Early researchers see these two aspects of policy for teaching as closely related (e.g., Anderson, 1995; Oser & Baeriswyl, 2001) but in recent studies the factor concerned with the learning opportunities is not restricted to the opportunities offered to their students associated with formal teaching (e.g., Creemers & Kyriakides, 2010; Muijs & Reynolds, 2011; Reynolds et al., 2014; Scheerens, 2013). These studies also show that there are schools which are effective in maximising the use of teaching time (quantity of teaching) but not in providing further learning opportunities than those offered by the official curriculum and the other way around. The third aspect of school policy for teaching is concerned with the attempt of schools to improve the teaching practice by supporting teachers to develop effective teaching skills (see Creemers, Kyriakides, & Antoniou, 2013; Scheerens, 2013). Specifically, the following indicators of the school policy on the *quantity of teaching* are considered:

- school policy on managing teaching time (e.g., lessons starting and finishing on time; no interruption of lessons for staff meetings and/or other school events);
- policy on student and teacher absenteeism;

[1] In the methods section, we treat these three aspects as subscales capturing the overarching scale of the policy for improving teaching.

- policy on homework; and
- policy on lesson schedule and timetable.

School policy on *providing learning opportunities* is examined by looking at the extent to which teachers and other school stakeholders take actions to ensure that students are offered extra-curricular activities which promote student learning (Scheerens, 2013; Wang, 1998). For example, school trips are organised to enrich the learning opportunities offered to students during the school hours. Schools could also encourage teachers to offer extra-curricular activities during outside school hours (e.g., participating in projects and charity activities, preparing students for competitions). Schools may also provide further support to students with special needs (including gifted or talented children). Secondary analyses of international studies show that schools with effective policies on providing learning opportunities can better support their student learning (Schleicher, 2014). In this way, we investigate the extent to which a school attempts to capitalize on excursions and other extra-curricular activities for teaching/learning purposes.

School policy on *the quality of teaching* is concerned with the extent to which the school stakeholders have a common understanding and guidelines for effective teaching practices. These practices are expected to refer to teacher behaviours in the classroom such as the degree to which the teacher provides orientation and/or structuring tasks, gives feedback, and poses appropriate questions. Therefore, the examination of school policy on teaching reveals that effective schools are able to make decisions on maximizing the use of teaching time and the learning opportunities offered to their students. In addition, effective schools support their teachers in their attempts to help students learn by using effective teaching practices (Bruhwiler & Blatchford, 2011).

B) School Policy for Improving the SLE

Since learning does not only take place inside classrooms, we also need to explore the impact of the school policy for improving the SLE. Over the past four decades, the work on the SLE has rapidly expanded covering issues such as the interpersonal relationships between the school personnel and the management team, as well as the support provided to students (e.g., Lüftenegger et al., 2012; Mainhard, Brekelmans, & Wubbels, 2011). From this array of elements, here we focus on policy initiatives only if they are aiming to improve stakeholders' learning, and through that student learning. This is accomplished by focusing on the following four aspects[2] of school policy for improving SLE which were systematically found to be associated with student learning outcomes:

a. student behaviour outside the classroom;
b. collaboration and interaction between teachers;
c. partnership policy (i.e., relationship between school and community, parents and advisors);
d. provision of sufficient learning resources to students and teachers.

Apart from the first element which is directly related to student learning, the next two elements underscore how student learning can be facilitated through two main additional stakeholders: teachers and parents. For example, collaboration and interaction between teachers may not only contribute to their professional development (i.e., teacher learning), but may also have an effect on teaching practice and thereby may improve student learning (Goddard, Goddard, & Tschannen-Moran, 2007). Similarly, by involving parents in the functioning of schools and also providing them with opportunities for learning, the school facilitates learning at two fronts: through the classroom learning environment (e.g., when parents provide teachers with information regarding their children or bring human and other resources to the school) and the home learning environment (e.g., when parents are informed

[2] As we did with policy for teaching, in the methods section, we treat these four aspects as subscales of policy for improving SLE.

on how to support/supervise their children when doing their homework) (Chapman & Fullan, 2007).

The fourth aspect refers to the policy on providing resources for learning. The availability of learning resources in schools may not only have an effect on student learning, but may also encourage teachers' own learning (Hattie, 2009). For example, the availability of computers and software for teaching geometry may contribute to teacher professional development since it may encourage teachers to find ways to use the software in their teaching practice to become more effective.

Research Aims

This paper aims to explore indirect effects of school policy related to improving teaching and the SLE on student achievement. Specifically, we examine whether the school policy has an impact on student achievement through changing the actions of teachers. Moreover, we investigate whether there is a reciprocal relationship between school policy and the actions of teachers. In this way, two main elements of the framework concerned with the impact of school policy on student achievement are tested.

Methods

Design of the Study

A longitudinal study investigating the impact of school policy and stakeholders' actions on student outcomes was undertaken. The longitudinal design allows searching for indirect effects of school policy but also for examining whether a reciprocal relation among policy and stakeholder actions exists. The study lasted for three school years. We collected data on student achievement at the beginning of the study and at the end of each consecutive school year. In each year, a questionnaire measuring school policy was also administered to all

teachers of the school sample. In addition, all teachers had to complete a questionnaire measuring the actions they had taken to deal with challenges/problems that could have a direct or indirect impact on their teaching. The two questionnaires were administered toward the end of the school year (i.e., April), when the teachers could more accurately evaluate the school policy and their actions during the past year.

Participants

Statistical power is an issue that has to be taken into account in designing studies which are expected to produce nested data to be analyzed through multilevel modelling approaches. It is typically recommended that at least 40 higher-level units (e.g. schools) be sampled to tap sufficient variance (Cools, De Fraine, Van den Noortgate, & Onghena, 2009). Since this study was longitudinal, we drew data from a relatively large number of schools. Thus, stratified sampling was used to select 70 out of 191 Cypriot primary schools by taking into account the five educational districts in Cyprus and whether schools were situated in an urban or rural area. Complete datasets over the period of three school years were collected from 64 out of 70 participating schools (six schools were dropped from the analyses because of substantial changes in their teaching staff). Complete achievement data for each measurement period were available for 2936 out of the 3135 students of the 64 schools. Although missing cases were less than 7% of the student participants, the Full Information Maximum Likelihood (FIML) estimation approach was used (see section on data analysis below) which makes use of all cases with at least one measurement occasion and thereby there was not any need to drop all cases with incomplete data (see Hox & Maas, 2001).

No statistically significant differences were identified between the final sample and the population in terms of students' gender (X^2=0.85, d.f.=1, p=0.36) or class size (t=0.98, d.f.=132, p=0.33). Hence, it can be claimed that a nationally representative sample of Cypriot Grade-4 students was drawn in terms of these two characteristics. It was not possible to

examine whether the sample was nationally representative in terms of any other characteristics, such as students' socio-economic status and their achievement, since no national data on these characteristics are available.

Variables

Output measure: Achievement in mathematics. Data on student achievement in mathematics were collected by using author-developed tests administered to the student sample at the beginning of Grade 4 (September 2009) and at the end of Grades 4 (May 2010), 5 (May 2011) and 6 (May 2012). We used this battery of tests for two reasons: first, because of the lack of any nationally developed tests in Cyprus; second, because their psychometric properties have been established in previous studies conducted in Cyprus (see Kyriakides & Creemers, 2008). It was found that less than 5% of the students scored over 80% of the maximum and less than 13% of the students scored over 72% of the maximum. Therefore, the ceiling effect was less probable. The floor effect was also not a concern, because no student showed full zero performance. The Extended Logistic Model of Rasch (Andrich, 1988) was used to analyze data that emerged from each administration period separately. Data analysis revealed that each scale had satisfactory psychometric properties. Parameter estimates were placed on a common scale using IRT equating methods (Hambleton & Swaminathan, 1985). Then the scale was linearly transferred into a predetermined scale with a mean of 10 and a standard deviation of 2.

Student background factors. Information was collected on two student background factors: gender (0=boys, 1=girls), and socio-economic status (SES). Five SES variables were available: father's and mother's highest education level (i.e., graduate of primary school,

graduate of secondary school or graduate of college/university), the social status of father's and mother's job and the financial situation of the family. Following the classification of occupations used by the Cyprus Ministry of Finance, it was possible to classify parents' occupations into three almost equivalent in size groups: working-class occupations (30%), middle-class occupations (39%) and upper-middle-class occupations (31%). Using structural equation modelling techniques, a first-order factor model was established. This model was found to fit the data (i.e., X^2=9.4, d.f.=5, p=0.094; CFI = 0.961; RMSEA = 0.064) and thereby an indicator of SES emerged from this model.

School policy and teachers actions. The explanatory variables which refer to the school policy and teachers' actions were measured by asking all participating teachers (n=658) to complete two questionnaires. The overall response rate was very high (82,1%) and it ranged from 77,5% to 90,9% across schools. Moreover, from each school we had at least 7 teachers with complete data sets. Furthermore, the chi-square test did not reveal any statistically significant difference in the response rate across the 64 schools of our sample (X^2 =57.12, *df*=63, *p*=.38). Hence, it can be claimed that our sample is representative of the whole population in terms of how the teachers are distributed in each of these 64 schools. Finally, the missing responses to each questionnaire item were very small (less than 5%).

The first questionnaire was designed to collect information on school policy from each teacher. To capture school policy, we did not restrict ourselves to investigating the formal school policy as defined in the school plan. Teachers were asked to provide information about a number of activities that take place in their school to clarify the expected outcomes/actions to teachers, parents, and students in relation to the aspects of policy for teaching and policy for school learning environment mentioned in the third section of the paper. The three aspects of policy for teaching comprised the three subscales considered for

measuring this dimension and the four aspects of policy for improving SLE comprised the four respective subscales for measuring the latter dimension.

For example, to measure the aspect of school policy on quantity of teaching, we used items related to issues discussed during staff meetings (e.g., dealing with teacher and student absenteeism, amount and type of homework). Teachers were also asked to refer to the extent to which these issues were discussed in documents and other materials which are distributed by the school management team to school stakeholders (i.e., teachers, students, and parents). Teachers were not only asked whether these issues were covered in the policy documents, but also whether the documents made explicit to the teachers what they are expected to do. Finally, teachers were asked whether the school management team provides support to the teachers in order to help them implement the policy.

The items of this subscale and all the other subscales discussed above have been used in previous studies testing the validity of the dynamic model of educational effectiveness (Creemers & Kyriakides, 2008). This model refers to the importance of school policy for teaching and policy for improving the school learning environment and propose a framework for measuring not only quantitative but also qualitative characteristics of each factor that are in line with the proposed framework. Through these studies, support to the construct validity of the teacher questionnaire has been provided (see Creemers & Kyriakides, 2010; Kyriakides & Creemers, 2012). Although these subscales are presented in a book concerned with the use of the knowledge base of educational effectiveness research for school improvement purposes (see Creemers & Kyriakides, 2012), a representative item for each subscale is also given in Table 1. Tables 2 and 3 provide information about the reliability and generalizability of each subscale and the two overall scales corresponding to the dimensions of school policy (i.e., teaching and improving SLE).

Teachers' actions were measured by administering a self-report questionnaire to each teacher. Specifically, a five-point Likert scale was used to measure teachers' actions, ranging from 1 (never happens) to 5 (always happens). To design the items on teacher actions, a group interview with the headmasters of the school sample was conducted. During this interview, headmasters were asked to refer to the types of actions their teachers had taken with regard to each aspect of the school policy for teaching and SLE mentioned in the third section of the paper. A content analysis of the headmasters` responses helped classify these actions into categories. These categories are concerned with each aspect of school policy dealing with improving teaching and the SLE and are presented in Appendix 1.

The Internal Reliability and Generalisability of Scales Measuring School Policy and Teacher Actions

This section presents results on the internal reliability of each subscale measuring school policy for teaching and policy for SLE. The internal reliability of the relevant subscales measuring teacher actions for improving teaching and improving SLE was also computed. Reliability was computed for each subscale and scale by calculating multilevel λ (Snijders & Bosker, 1999) and Cronbach alpha for data aggregated at the school level. The value of Cronbach alpha represents consistency across items, whereas multilevel λ represents consistency across groups of teachers. The results are presented in Tables 2 and 3, showing reliability coefficients to be very high (around .85). Using Mplus (Muthén & Muthén, 2001) the intra-class correlations of the subscales were also computed. The intra-class correlations, which indicate the amount of variance of the teacher questionnaire situated at the between-level (i.e., teachers within the same school), are also illustrated in Tables 2 and 3. We can observe that the percentages of variance at the school level were between 30% and 42%. These percentages are rather high compared to other instruments that measure perceptions in

clustered or interdependent situations (Den Brok, Brekelmans, & Wubbels, 2004; Kunter, Baumert, & Koller, 2007).

Insert Tables 1, 2 and 3 about here

For each scale, the Extended Logistic model of Rasch was used to examine whether the subscales comprising each scale formed one factor. This analysis was conducted four times for each of the following rating scales of the study [i.e., (i) the school policy for improving teaching, (ii) the school policy for improving SLE, (iii) teacher actions for improving teaching, and (iv) teacher actions for improving SLE]. This set of analyses was then repeated three times for each of the three measurement periods, thus resulting in 12 outputs. To examine the validity of these scales, these outputs were considered along three criteria. First, the infit mean squares and the outfit mean squares were found to be near one and the values of the infit t-scores and the outfit t-scores were approximately zero. Second, the indices of teachers and of items separation were higher than 0.85, indicating that the separability of each scale was very good. Third, all the thresholds of the items comprising each scale increased monotonically and their distance met acceptable criteria since thresholds increased by at least 1.4 logits (revealing distinction between categories) but no more than 3.5 logits (avoiding large gaps in the variable). All these findings reveal that there was a good fit to the model when teachers' responses to each of the four scales were taken into account (see Bond & Fox, 2001). Therefore, for each measurement period, the Rasch person estimates were used to estimate four different scores corresponding to the four scales. In order to generate these scores the Quest uses the Joint Maximum Likelihood estimation (JML) because of its flexibility with missing data (Adams & Khoo, 1996). Moreover, it does not assume a person distribution. Furthermore, any estimation bias is not a real concern, except in rare cases

where exact probabilistic inferences are to be made from short tests or small samples, which was not the case in the present study (see Bond & Fox, 2001).

Data Analysis

Classic multilevel regression analysis does not satisfy our needs to search for reciprocal relations between school policy and teacher actions and identify indirect effects of school policy on student achievement. In contrast, multilevel Structural Equation Modeling (SEM) allows for exploring reciprocal relationships while at the same time accounting for the nested nature of the data (e.g., Goldstein & McDonald, 1988; Muthén & Satorra, 1989). Since this study investigates the impact of school policy on student achievement and thereby its variables are situated at the student and school level, a two level model (students within schools) was employed by using the Mplus 7 software (Muthén & Muthén, 2001). It should be acknowledged that the data of this study are based on a three level (students within classrooms within schools) and ignoring the class level may distort the school- and student-level variance component and may bias standard errors downwards (Martinez, 2012; Snijder & Bosker, 1999). The class level was, however, not taken into account since the study does not measure any class level variable and for practical and parsimonious reasons a two-level model was used. This can be considered a limitation of this study; however even so the study can provide evidence about the impact of school factors which is relatively inexistent compared to the evidence on the impact of quality of teaching (see Scheerens, 2013; Reynolds et al., 2014).

To search for the impact of school policy on teachers actions, two separate analyses for each aspect of policy (i.e., policy for teaching and policy for improving SLE) were

conducted. In this way, we could find out which (if any) of the two aspects of school policy has an effect on student outcomes through changing teachers' actions. For example, we could test the assumption that policy for teaching has a stronger effect on student learning outcomes since it is expected to have an impact on improving quality of teaching and learning.

In each analysis, the Rasch person estimates for policy and the Rasch person estimates for teacher actions were used to test the model referring to the impact of policy on student learning outcomes. Similarly, the Rasch person (i.e., student) estimates were used for the variables concerned with achievement in mathematics. Although these variables are not directly measured, they are shown in rectangles (see Figures 2 and 3) since they cannot be considered as latent variables. Latent variables in SEM are variables with a factor analytic measurement model (Kline, 2010). On the other hand, achievement variables at level 2 represent random intercepts and are treated as latent variables and are, thereby, shown in ellipses.

Multilevel structural equation modeling (multilevel SEM) has become an established method to analyze multilevel multivariate data. The first useful estimation method was the pseudobalanced method. This method is approximate because it assumes that all groups have the same size, and ignores unbalance when it exists. Full Information Maximum Likelihood (FIML) estimation is now available, which is often combined with robust chi-squares and standard errors to accommodate unmodeled heterogeneity (MLR). In addition, diagonally weighted least squares (DWLS) methods have become available as estimation methods. Hox, Maas and Brinkhuis (2010) compared the pseudobalanced estimation method, ML(R), and two DWLS methods by simulating a multilevel factor model with unbalanced data. It was shown that both ML(R) and DWLS are genuine improvements on the pseudobalanced approximation (Hox et al., 2010). Thus, the more exact FIML approach using the standard

estimator MLR was used to search for indirect effects of school policy on student achievement.

To evaluate the fitting of our models we considered the Root Mean Square Error of Approximation (RMSEA), the Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI). We also considered the robust X^2 test statistic and parameter estimates. TLI and CFI values greater than .90 or .95 are typically interpreted to reflect an acceptable or excellent fit to the data, correspondingly. RMSEA values smaller than .05 or .08 are typically interpreted to reflect a close or a reasonable fit to the data, correspondingly (see Hu & Bentler, 1999). However, these indices reflect overall fit of the model and may not be able to detect the lack of fit at the higher level (Ryu & West, 2009). Thus, the SRMR for the within-model (SRMR-W) and the SRMR for the between model (SRMR-B), available in MPLUS, are reported and used to evaluate the fitting of each level.

Finally, to calculate the indirect effect of each aspect of school policy on student achievement, we used the multivariate delta method (see Olkin & Finn, 1995) which attempts to find the large sample standard error of the difference between a simple correlation and the same correlation partialled for a third variable. Mackinnon, Lockwood, Hoffman, West and Sheets (2002) compared 14 methods to test the statistical significance of the indirect effect of a variable. It was shown that methods based on a two steps approach lead to low Type I error rates and low statistical power. On the other hand, methods based on the distribution of the product and in the difference-in-coefficients had more accurate Type I error and greater statistical power.

Results

This section focuses on the impact of school policy on student achievement in mathematics. The first part investigates the impact that school policy on teaching can have on teachers'

actions to improve teaching and student outcomes; the second part is concerned with the policy and the actions taken to improve the SLE.

Based on the main assumptions of the proposed theoretical framework on the impact of school policy, the model that was tested assumes that there is a reciprocal relationship between the school policy on teaching and the actions that teachers take to improve teaching. This model also assumes that school policy has only an indirect effect on student outcomes. Figure 2 presents the multilevel SEM model that tests these two assumptions of the theoretical framework. The upper part of the figure (school level) demonstrates the relations among school policy and teacher actions and their impact on student achievement at school level. In the upper part of the model presented in Figure 2, there are two variables of interest, *school policy and teacher actions*, and each variable is regressed on both its own lagged score and the lagged score of the other variable at the previous measurement occasion. At the first wave of measurement (i.e., first school year), school policy and teacher actions are specified as exogenous and allowed to covary. The model also assumes that the disturbance terms for the same endogeneous variables over time are correlated. Similarly, the disturbance terms for the endogeneous variables measuring school policy and teacher actions are correlated at the same time point. Anderson and Williams (1992) argue that failing to consider these parameters can bias stability and cross-lagged estimates. In regard to the variables measuring student achievement at the school level, the model assumes that repeated measures of this variable can be expressed as a function of preceding value plus random disturbance. In addition, teacher actions have a direct effect on student achievement.

It was also examined whether background factors aggregated at the school level (i.e., average SES, percentage of girls) and school characteristics [i.e., size of the school, place of the school (rural versus urban)] have an effect on school policy, teacher actions, and student achievement. By running various analyses searching for effects of each background factor on

policy, teacher actions and student achievement, no statistically significant effect was found. For example, the average SES was not found to have a direct effect on any of the measures of school policy (either by adding these paths together or one at each time). Similarly, average SES was not found to have a statistically significant effect on any of the measures of teacher actions. We also reviewed the modification indices of the best fitting model (presented in Figures 2) and ran several additional models (that included additional paths both in isolation and simultaneously) but none of these paths was found to be statistically significant (even at .10 level). Therefore, these variables are not included in the upper level of Figure 2. Nevertheless, SES appears at the lower level since it was found to have direct and indirect effects on student achievement.

Model fit statistics revealed that the model presented in Figure 2 fits well to the data (X^2=27.14, d.f.=27, p=0.41; CFI=0.99, TLI=0.98; RMSEA=0.03; SRMR(B)-0.09 SRMR(W)=0.02). Since most cross-sectional studies search for direct effects of school policy, we also tested a model that assumes that school policy has both direct and indirect effects on student achievement. However, we identified no statistically significant direct effect of school policy on student achievement in any of the three end-of-year administration. Similarly, school policy at the end of year 2 and policy at the end of year 3 were not found to have a statistically significant direct effect on student achievement.

Insert Figure 2 about here

The following observations arise from the estimated standardized parameters of the model shown in Figure 2. First, at the lower level, SES was found to have a stronger direct effect on student achievement at the beginning of Grade 4 rather than at the end of Grades 4, 5, and 6. However, SES did not only have direct but also indirect effects on student achievement at the

end of each school year. Prior achievement in Grade 4 had an effect on achievement in mathematics at the end of Grade 4. Similarly, achievement at the end of Grade 4 and achievement at the end of Grade 5 had direct effects on achievement at the end of Grade 5 and the end of Grade 6 respectively. Second, at the school level, the prior measure of policy for teaching predicted relatively well the policy for teaching during the second and third years of the study. Third, school policy in each year was found to have an impact on changing the actions of teachers during the following school year. This impact of school policy on changing teachers' actions was found to be bigger than the impact that teachers' actions seemed to have on improving school policy. Finally, the actions that teachers took to improve teaching had an impact on student achievement in mathematics, whereas the school policy had only indirect effects on student achievement.

In regard to the impact of policy for improving the SLE on student learning outcomes, the theoretical model was also supported since the best fitting model was found to have the same structure as the model of Figure 2. Specifically, the best fitting model presented in Figure 3 assumes that there is a reciprocal relation between policy for SLE and the actions that teachers take to improve SLE. This model also assumes that school policy on the SLE has an indirect effect on student outcomes. Model fit statistics revealed that this model fit the data well (X^2=26.91, d.f.=26, p=0.54; CFI=0.98, TLI=0.96; RMSEA=0.03 SRMR(B)=0.10 SRMR(W)=0.03). The only exception was the SRMR index for the between level which was however close to the acceptable threshold. , Moreover, the standardized root mean square residual (SRMR) indicates that the model is well fitting at the lowest level but that the corresponding value for the school level is somewhat higher than the acceptable threshold.

The following observations arise from the estimated standardized parameters of the model shown in Figure 3.

Insert Figure 3 about here

First, as expected, the same observations made in Figure 2 also held for the student level. Second, the measure of school policy for improving SLE in Year 1 was found to have a relatively strong impact on school policy for SLE during Year 2 (0.60). Similarly, school policy for improving the SLE in Year 2 had equally strong impact on the policy for the SLE that schools had during the final year of the study. Third, prior measures of teacher actions also had an impact on the measures of teacher actions during the next school year; however, this impact was smaller than that of prior measures of school policy on the policy that the schools developed in the next year. Fourth, school policy regarding the SLE in each year was found to have an impact on changing the actions of teachers during the next school year.

The parameter estimates shown in Figures 2 and 3 seem to reveal that the impact that the school policy for improving the SLE had on the teachers' actions during the next year is as strong as the impact of policy for teaching upon the actions of teachers for improving teaching. In both figures the sizes of the impact that policy had on changing teacher actions is around .35. Finally, the actions that teachers took to improve SLE had an impact on student achievement in mathematics, whereas the school policy had an indirect effect on student achievement.

Using the multivariate delta method, the following statistically significant indirect effects of school policy for teaching on student achievement were identified. First, the indirect effect of school policy for teaching during the first year of the study on student achievement at the end of grade 5 (i.e., end of year 2 of the study) was equal to 0.12. Second, the indirect effect of school policy for teaching during the second year of the study on student achievement at the end of Grade 6 (i.e., end of year 3) was 0.13. Third, the total effect of school policy for teaching during the first year of the study on student achievement at the end

of Grade 6 was 0.18. Similarly, the following statistically significant indirect effects of policy for improving the SLE on student achievement were identified. First, policy for improving SLE during the first year of the study had an indirect effect on achievement at the end of grade 5 (0.11). Second, the indirect effect of policy for improving SLE during the second year of the study on student achievement at the end of grade 6 was 0.13. Finally, the total effect of policy for improving SLE during the first year of the study on student achievement at the end of grade 6 was 0.17.

Discussion

This study presents and empirically validates two of the main assumptions of a framework developed to explore the effects of school policy on student achievement. Specifically, we examined whether school policy for teaching has an impact on changing teachers' actions and, through that, on student learning outcomes. We also investigated the impact of policy for improving the SLE on teacher actions and, in turn, on student learning. In this way, the assumption that school policy has an indirect effect on student achievement is tested. Moreover, we examined whether there is a reciprocal relationship between school policy and teachers' actions. The relationships shown in Figures 2 and 3 seem to support these assumptions of the proposed theoretical framework especially since both school policy for teaching and school policy for the SLE were found to have a direct effect on changing teachers' actions and, through that, an indirect effect on improving student learning outcomes. In what follows, we draw implications of the study findings for research, policy, and practice. The limitations of this study are also acknowledged and suggestions for further research are provided.

First, the study findings seem to reveal that cross-sectional studies investigating the impact of school policy on student outcomes may underestimate the total effect that school

policy may have on student outcomes. In particular, while in cross-sectional studies (e.g., Land, 2002; Maslowski et al., 2007) this effect was found to be very small (i.e., around .10), in this study, the total effect of school policy on student achievement at the end of the third year of the study was about three times as big. Specifically, student achievement at the end of grade 6 was found to be related not only with the school policy at the end of second year but also with the policy that was in place in the previous school year. Thus, this difference in the reported effect sizes can be attributed to the fact that in longitudinal studies cumulative effects of school policies can be estimated. In addition, cross-sectional studies do not take into account that school policy may have situational effects on student achievement. Searching for correlations between school policy and student achievement is likely to underestimate the impact of school policy because it implies that effective schools should have a school policy for any issue associated with teaching and the SLE. However, the actual impact of school policy can only be examined if both its direct (i.e., changes in stakeholders' action) and indirect (i.e., improvement in student learning) effects are examined. Thus, this paper argues for the importance of conducting longitudinal studies and measuring school policy and the actions of stakeholders over a period of time to identify the impact of school policy on student outcomes.

Second, the study results suggest that it is important to make a distinction between school policy and teachers' actions. A reciprocal relationship between school policy and teachers' actions was identified. Although some of these reciprocal relationships could be considered small, they are of similar magnitude as those identified in other studies exploring reciprocal relationships, such as those dealing with student motivation and learning outcomes (Marsh & Craven, 2006). This framework could be utilized in developing school policies to promote student learning. Specifically, it could be claimed that by introducing a school policy for improving teaching and the SLE, teachers' actions could change and the SLE and/or

teaching practices could be improved. Through the effect that school policy could have on teachers' actions, improvement of SLE and the teaching practice and ultimately student learning could be achieved. However, it should be acknowledged that school policy was not found to have any direct effect on student learning outcomes and its role in promoting student learning outcomes should not be overstated. Teacher actions were found to have a direct effect and thereby changing school policy may not necessarily result in changing teacher actions and through that in promoting student learning outcomes.

At the same time, this study reveals a reciprocal relationship between school policy and teachers' actions. Teachers' actions of a previous year were found to have an impact on the development of school policy during the next year. This finding implies that the introduction of a new policy could be informed by data concerning the actions of teachers during the previous years. By collecting data on the quality of both the current policy and the actions of teachers, priorities for improving specific aspects of school policy could be identified and new policy targets could more accurately be defined (Creemers & Kyriakides, 2012).

Third, the fact that teachers' actions for improving teaching and SLE were found to have direct effects on student learning outcomes implies that teachers should be supported to improve their teaching practice and the SLE. To figure out whether the new policy meets these requirements, the impact that the new policy may have on changing teachers' actions and through that on improving teaching and learning should be investigated. It should however be acknowledged that in this longitudinal study it was not feasible to measure quality of teaching over a period of three years. Further research is, therefore, needed to find out whether school policy has an impact on changing teachers' actions and through that on improving teaching practice and promoting student learning outcomes. In this way, the

proposed framework for investigating the impact of school policy on student learning outcomes at not only the school but also the class level could be tested.

Fourth, additional suggestions for further research are pointed out especially since the study presented here refers only to a part of the proposed framework. The framework assumes that school policy may also have an effect on improving not only teaching but also the school learning environment through changing teachers actions. Therefore, further research should measure not only the quality of teaching but also the school learning environment over time in order to see whether improvement of quality of teaching and SLE may take place due to the impact that school policy may have on changing teachers' actions. In this way, we may also be able to investigate relations between policy for teaching and policy for improving SLE and whether they have joint effects on student achievement through improving SLE and quality of teaching.

Fifth, this study is limited in investigating the impact of policy and actions on student achievement in only one subject (Mathematics). Further research is needed to find out whether similar effects on student learning outcomes can be identified when achievement in other subject as well as in other learning domains (e.g., affective, meta-cognitive) are taken into account

Sixth, this study provides some empirical support to the proposed framework, by explaining the conditions under which school policy could have an impact on student achievement through changing teachers' actions. However, there is a need for further studies to investigate relations between school policy and other stakeholders' actions (e.g., parents, students). For example, a study investigating the relationship between partnership policy and parents' actions could provide further support to the proposed framework and may have further implications for the role of school leaders in improving the SLE. At this point, it could be claimed that school policy may have a greater impact on changing the actions of

stakeholders within school (e.g., teachers, school-management team) and less impact on stakeholders outside school (e.g., parents, members of the wider school community). Thus, further studies comparing the impact of school policy on changing the actions of stakeholders within the school and those of stakeholders outside the school may help us identify how far the establishment of school policy can promote learning and to search for other factors within the wider educational environment that also affect the actions of stakeholders aiming toward improving learning. In this way, we will avoid overestimating the effect that school policy may have on student learning outcomes and more comprehensively analyse the complex situation between designing and implementing a policy at school level and improving the school learning environment and the teaching practice in order to promote student learning.

Finally, the proposed framework could also be used to investigate the impact of national policy on student achievement. Given that the distinction between school policy and actions of stakeholders helped us to start understanding the conditions under which school policy may have an impact on student learning, one might explore whether similar assumptions could be used to form the basis of understanding the impact of system policy (district or national) on student achievement. Such studies may contribute to further develop research on policy implementation. It should, however, be acknowledged that beyond the potential impact of national policy on stakeholders' actions, the wider environment of an educational system may also influence these actions. This implies that understanding the impact of national policy is a more complicated task than searching for the impact of school policy on student achievement. Nevertheless, the proposed framework could help us explore whether similar mechanisms are needed to establish and evaluate policies at both the system and school levels in order to promote learning.

References

Adams, R.J., & Khoo, S. (1996). *Quest: The interactive test analysis system, Version 2.1*. Melbourne: ACER.

Anderson, L.W. (1995). Time allocated and instructional, In L.W. Anderson (Ed), *International Encyclopaedia of Teaching and Teacher Education,* (pp 204-207). Oxford: Elsevier.

Anderson, S., & Williams, L.J. (1992). Assumptions about unmeasured variables with studies of reciprocal relationships: the case of employee attitudes. *Journal of Applied Psychology, 77,* 638-650.

Andrich, D. (1988). A general form of Rasch's extended logistic model for partial credit scoring. *Applied Measurement in Education*, *1*(4), 363–378.

Bell, L., & Stevenson, H. (2006). *Education policy: process, themes and impact. Leadership for learning*. London: Routledge.

Bond, T.G., & Fox, C.M. (2001). *Applying the Rasch model: Fundamental measurement in the human Sciences*. Mahwah, NJ: Lawrence Erlbaum Associates.

Bruhwiler, C., & Blatchford, P. (2011). Effects of class size and adaptive teaching competency on classroom processes and academic outcome. *Learning and Instruction, 21*, 95-108.

Caldwell, B.J. (2003). A theory of learning in the self managing school. In A. Volansky & I. Friedman (Eds.), *School-based management: An international perspective* (pp. 93–116). Jerusalem: State of Israel, Ministry of Education.

Carroll, J.B. (1963). A model of school learning. *Teachers College Record, 64*, 723-733.

Chapman, C., & Fullan, M. (2007). Collaboration and partnership for equitable improvement: Towards a networked learning system? *School Leadership and Management, 27*(3), 207-213.

Cohen, D.K., & Hill, H.C. (2001). *Learning policy*. New Haven, CT: Yale University Press.

Conley, D.T., & Brown, R.S. (2003). *Comparing state high school assessments to standards for success in entry level university courses*. Unpublished manuscript, University of Oregon.

Cools, W., De Fraine, B., Van den Noortgate, W., & Onghena, P. (2009). Multilevel design efficiency in educational effectiveness research. *School effectiveness and school improvement, 20*(3), 357-373.

Creemers, B.P.M. (1994). *The Effective Classroom*. London: Cassell.

Creemers, B.P.M., & Kyriakides, L. (2008). *The dynamics of educational effectiveness: A contribution to policy, practice and theory in contemporary schools.* London: Routledge.

Creemers, B.P.M., & Kyriakides, L. (2010). School factors explaining achievement on cognitive and affective outcomes: Establishing a dynamic model of educational effectiveness. *Scandinavian Journal of Educational Research, 54*(1), 263-294.

Creemers, B.P.M., & Kyriakides, L. (2012). *Improving Quality in Education: Dynamic Approaches to School Improvement.* London and New York: Routledge.

Creemers, B.P.M., Kyriakides, L., & Antoniou, P. (2013). *Teacher professional development for improving quality of teaching*. Dordrecht, the Netherlands: Springer.

Datnow, A. (2006). Connections in the policy chain: the 'co-construction' of implementation in comprehensive school reform. In M.I. Honig, (Ed.), *New directions in education policy implementation: Confronting complexity* (pp. 105-124). Albany, NY: The State University of New York Press.

Den Brok, P., Brekelmans, M., & Wubbels, T. (2004). Interpersonal teacher behaviour and student outcomes. *School Effectiveness and School Improvement, 15*(3-4), 407-442.

Duke, L.D., Tucker, D.P., Higgins, J., Lanphear, L., Levy, K.M., & Salmonowicz, J.M. (2008). Are Local Policies Supporting Instruction Becoming Standardized? *Leadership and Policy in Schools, 7*(1), 1-29.

Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review, 13*(1), 1-22.

Fauth, B., Decristan, J., Rieser, S., Klieme, E., & Büttner, G. (2014). Student ratings of teaching quality in primary school: Dimensions and prediction of student outcomes. *Learning and Instruction, 29*, 1-9.

Flessa, J.J. (2012). Principals as Middle Managers: School Leadership during the Implementation of Primary Class Size Reduction Policy in Ontario. *Leadership and Policy in Schools, 11*(3), 325-343.

Goddard, Y.L., Goddard, R.D., & Tschannen-Moran, M. (2007). *Teachers College Record, 109*(4), 877-896.

Goldstein, H., & McDonald, R.P. (1988). A general model for the analysis of multilevel data. *Psychometrika, 53,* 435–467.

Goodson, J.R., McGee, G.W., & Cashman, J.F. (1989). Situational leadership theory: a test of leadership prescriptions. *Group Organization Management, 14*(4), 446-461.

Hambleton, R.K., & Swaminathan, H. (1985). *Item response theory: Principles and applications*. Boston: Kluwer.

Hattie, J. (2009). *Visible learning: a synthesis of over 800 meta-analyses relating to achievement*. New York: Routledge.

Honig, M.I. (2006). Building policy from practice: implementation as organizational learning. In M. I. Honig, (Ed.), *New directions in education policy implementation: Confronting complexity* (pp. 125-148). Albany, NY: The State University of New York Press.

Hox, J.J., & Maas, C.J.M. (2001). The Accuracy of Multilevel Structural Equation Modeling With Pseudobalanced Groups and Small Samples. *Structural Equation Modeling, 8*(2), 157-174.

Hox, J.J., Maas, C.J.M. & Brinkhuis, M.J.S. (2010). The effect of estimation method and sample size in multilevel structural equation modeling. *Statistica Neerlandica, 64,* 157-170.

Hu, L.-T., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Coventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55.

Knapp, M.S. (1997). Between systemic reforms and the mathematics and science classroom: The dynamics of innovation, implementation, and professional learning. *Review of Educational Research, 67*(2), 227-266.

Kline, R.B. (2010). *Principles and practice of structural equation modelling* (3rd ed.). New York: Guilford Press.

Kunter, M., Baumert, J., & Koller, O. (2007). Effective classroom management and the development of subject-related interest. *Learning and Instruction, 17*, 494-509.

Kyriakides, L., & Creemers, B.P.M. (2008). A longitudinal study on the stability over time of school and teacher effects on student learning outcomes. *Oxford Review of Education, 34*(5), 521-545.

Kyriakides, L., & Creemers, B.P.M. (2012). School policy on teaching and school learning environment: direct and indirect effects upon student outcome measures. *Educational Research and Evaluation: An International Journal on Theory and Practice, 18*(5), 403-424.

Kyriakides, L., Creemers, B., Antoniou, P., & Demetriou, D. (2010). A synthesis of studies searching for school factors: Implications for theory and research. *British Educational Research Journal, 36*(5), 807-830.

Land, D. (2002). Local school boards under review: Their role and effectiveness in relation to students' academic achievement. *Review of Educational Research, 72*(2), 229-278.

Lashway, L. (2002). Using school board policy to improve student achievement. *ERIC Digest*, 163.

Leithwood, K., Steinbach, R., & Jantzi, D. (2002). School leadership and teachers' motivation to implement accountability policies. *Educational Administration Quarterly, 38*(1), 94-119.

Lüftenegger, M., Schober, B., van de Schoot, R., Wagner, P., Finsterwald, M., & Spiel, C. (2012). Lifelong learning as a goal - Do autonomy and self-regulation in school result in well prepared pupils? *Learning and Instruction, 22*, 27-36.

MacKinnon, D.P., Lockwood, C.M., Hoffman, J.M., West, S.G., & Sheets, V. (2002). A Comparison of Methods to Test Mediation and Other Intervening Variable Effects. *Psychological Methods, 7*(1), 83-104.

Mainhard, M.T., Brekelmans, M., & Wubbels, T. (2011). Coercive and supportive teacher behaviour: Within- and across-lesson associations with the classroom social climate. *Learning and Instruction, 21*, 345-354.

Marsh, H.W., & Craven, R.G. (2006). Reciprocal effects of self-concept and performance from a multidimensional perspective: Beyond seductive pleasure and unidimensional perspectives. *Perspectives on Psychological Science, 1*(2), 133-163.

Martínez, J.F. (2012). Consequences of omitting the classroom in multilevel models of schooling: an illustration using opportunity to learn and reading achievement. *School Effectiveness and School Improvement*, *23*(3), 305-326.

Maslowski R., Scheerens J., & Luyten H. (2007). The effect of school autonomy and school internal decentralization on students' reading literacy. *School Effectiveness and School Improvement*, *18*(3), 303-334.

Muijs, D., & Reynolds, D. (2011). *Effective teaching. Evidence and practice*. London: Sage.

Muthén, L.K., & Muthén, B.O. (2001). *MPlus user's guide.* Los Angeles: Muthén and Muthén.

Muthén, B.O., & Satorra, A. (1989). Multilevel aspects of varying parameters in structural models. In R.D. Bock (Ed.) *Multilevel analysis of educational data* (pp. 87-99). San Diego, CA: Academic Press.

Nir, E.A. & Ben Ami, T. (2005). School-Parents Relationship in the Era of School-Based Management: Harmony or Conflict? *Leadership and Policy in Schools, 4*(1), 55-72.

Olkin, I., & Finn, J.D. (1995). Correlation redux. *Psychological Bulletin, 118*, 155–164.

Oser, F.K., & Baeriswyl, F.J. (2001). Choreographies of teaching: Bridging instruction to learning. In V. Richardson (Ed.), Handbook of research on teaching (pp.1031-1065). Washington, DC: American Educational Research Association.

Reynolds, D., Sammons, P., De Fraine, B., Van Damme, J., Townsend, T., Teddlie, C., & Stringfield, S. (2014). Educational effectiveness research (EER): a state-of-the-art review. *School Effectiveness and School Improvement, 25*(2), 197-230.

Robertson, P. J., Wohlstetter, P., & Mohrman, S. A. (1995). Generating curriculum and instructional reforms through school-based management. *Educational Administration Quarterly, 31,* 375-404.

Ryu, E., & West, S.G. (2009). Level-Specific Evaluation of Model Fit in Multilevel Structural Equation Modeling. *Structural Equation Modeling: A Multidisciplinary Journal*, *16*(4), 583-601.

Scheerens, J. (2013). The use of theory in school effectiveness research revisited. *School Effectiveness and School Improvement, 24*(1), 1-38.

Scheerens, J., Seidel, T., Witziers, B., Hendriks, M., & Doornekamp, G. (2005). *Positioning and validating the supervision framework*. Enschede/Kiel: University of Twente, Department of Educational Organisational and Management.

Schleicher, A. (2014). *Equity, Excellence and Inclusiveness in Education: Policy Lessons from Around the World.* Paris: OECD.

Smith, M.S., & O'Day, J. (1991). Systemic school reform. In S. Fuhrman & B. Malen (Eds.), *The politics of curriculum and testing* (pp. 233-268). Philadelphia: Falmer Press.

Snijders, T., & Bosker, R. (1999). *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling.* London: Sage.

Spillane, J.P. (2005). Primary school leadership practice: How the subject matters. *School Leadership and Management*, *25*(4), 383–397.

Spillane, J.P., Reiser, B.J., & Reimer, T. (2002). Policy implementation and cognition: Reframing and refocusing implementation research. *Review of Educational Research, 72*(3), 387-431.

Talbert, J.E. (2002). Professionalism and politics in high school teaching reform. *Journal of Educational Change, 3*(3/4), 339-363.

Teddlie, C., & Reynolds, D. (2000). *The International handbook of school effectiveness research.* London: Falmer Press.

Townsend, T. (2007). *International Handbook of School Effectiveness and Improvement*. Dordrecht, the Netherlands: Springer.

Tyack, D., & Cuban, L. (1995). *Tinkering toward Utopia: A Century of Public School Reform.* United States of America: Harvard College.

Vitaska, S. (2008). *Strong leaders, strong schools: 2007 state laws*. Denver, CO: National Conference of State Legislatures.

Wang, J. (1998). Opportunity to Learn: The Impacts and Policy Implications. *Educational Evaluation and Policy Analysis, 20*(3), 137-156.