



UvA-DARE (Digital Academic Repository)

Changing classroom practices: the role of school-wide capacity for sustainable improvement

Slegers, P.J.C.; Thoonen, E.E.J.; Oort, F.J.; Peetsma, T.T.D.

DOI

[10.1108/JEA-11-2013-0126](https://doi.org/10.1108/JEA-11-2013-0126)

Publication date

2014

Document Version

Final published version

Published in

Journal of Educational Administration

[Link to publication](#)

Citation for published version (APA):

Slegers, P. J. C., Thoonen, E. E. J., Oort, F. J., & Peetsma, T. T. D. (2014). Changing classroom practices: the role of school-wide capacity for sustainable improvement. *Journal of Educational Administration*, 52(5), 617-652. <https://doi.org/10.1108/JEA-11-2013-0126>

General rights

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

UvA-DARE is a service provided by the library of the University of Amsterdam (<https://dare.uva.nl>)



Changing classroom practices: the role of school-wide capacity for sustainable improvement

Changing
classroom
practices

617

Peter J.C. Sleegers

Department of Education, University of Twente, Enschede, The Netherlands

Eric E.J. Thoonen

Dutch Inspectorate of Education, Utrecht, The Netherlands, and

Frans J. Oort and Thea T.D. Peetsma

*Research Institute of Child Development and Education,
University of Amsterdam, Amsterdam, The Netherlands*

Received 27 November 2013

Revised 17 May 2014

Accepted 17 May 2014

Abstract

Purpose – Elementary schools have been confronted with large-scale educational reforms as strategies to improve the educational quality. While building school-wide capacity for improvement is considered critical for changing teachers' classroom practices, there is still little empirical evidence for link between enhanced school capacity for improvement and instructional change. In this study, the authors examined the impact of school improvement capacity on changes in teachers' classroom practices over a period of time. Leadership practices, school organizational conditions, teacher motivation and teacher learning were used to measure school-wide capacity for improvement. The paper aims to discuss these issues.

Design/methodology/approach – Mixed-model analysis of longitudinal data over a four years (2005-2008) period of time from 862 teachers of 32 Dutch elementary schools were used to test the impact of school improvement capacity on changing teachers' instructional practices.

Findings – The results showed that organizational-level conditions and teacher-level conditions play an important, but different role in changing teachers' classroom practices. Whereas teacher factors mainly affect changes in teachers' classroom practices, organizational factors are of significant importance to enhance teacher motivation and teacher learning.

Research limitations/implications – More longitudinal research is needed to gain better insight into the opportunities and limits of building school-wide capacity to stimulate instructional change.

Practical implications – By encouraging teachers to question their own beliefs, facilitating opportunities for teachers to work together to solve problems, and through the promotion of shared decision making, school leaders can reinforce the personal and social identification of teachers with the organization. As a consequence, teachers will feel increasingly committed and are more willing to change their classroom practices. Additionally, school leaders can use the findings from this study and the related instrument as a tool for school self-evaluation.

Originality/value – This paper contributes to a deeper understanding of the nature of changes in conditions for school improvement and its influence on changes in teachers' instructional practices over a period of time.

Keywords Leadership, Sustainability, Changed instruction, School organization, School-wide capacity, Teacher motivation and learning

Paper type Research paper

Introduction

During the past decade, elementary schools in and outside the USA have been confronted with on-going large-scale educational reforms and restructuring movements, including "high-stakes" accountability policies that enforce tightened "output" controls, as strategies to improve the quality of education. In the Netherlands,



where this study takes place, calls for greater educational accountability as integral part of much broader school reform initiatives became quite insistent in the 1990s. Different strategies for increasing accountability have been developed, ranging from fostering competition among schools, implementing site-based management together with the increase of power for school governors, to national assessment by the schools inspectorate of key areas of the curriculum and student achievement.

More recently, policy-makers and researchers have stressed the need for more responsive forms of accountability by using models that try to find a balance between self-evaluations and external evaluations of schools (Mulford, 2005). Within these more responsive forms of accountability, schools in the Netherlands are expected to be capable of developing their own system of quality assurance through self-evaluation (Blok *et al.*, 2008; Geijsel *et al.*, 2010). The self-evaluation results of the schools should be valid and reliable and provide information about indicators included in the framework of the Dutch Inspectorate, such as results of student achievement tests, parents' satisfaction with the school, teachers' job satisfaction. If these requirements are met, the intensity and frequency of school inspection is adapted to the quality of the school self-evaluation and schools thus have "earned" more freedom to maneuver beyond prescribed accountability program. Given this context, building school-wide capacity for improvement by promoting teachers' individual and collective learning becomes vital for a schools' ability to cope with these accountability pressures (Hopkins, 2001; Parise and Spillane, 2010; Slegers and Leithwood, 2010; Stoll, 2009; Toole and Louis, 2002).

While policy-makers, scholars and practitioners acknowledge the importance of building school-wide capacity for continuous improvement, empirical evidence on the suggested claim is still very thin (Hallinger and Heck, 2011; Thoonen *et al.*, 2012). Findings from research into school improvement and educational change indicate that leadership practices, school organizational conditions, teacher motivational factors and teacher learning are crucial for improving teachers' classroom practices and student outcomes (e.g. Coburn, 2003; Geijsel *et al.*, 2009; Slegers *et al.*, 2002; Smylie, 1988; Thoonen *et al.*, 2011a). Whether schools can build school-wide capacity for improvement over a period of time and its impact on teaching has not been studied systematically. In most of the large-scale studies that have been carried out, researchers used a cross-sectional design. As consequence, the findings of these studies have mainly offered a "one-time snapshot" of schools' capacity to improve. Notwithstanding the value of cross-sectional studies, they are ill-equipped to describe how building capacity for sustainable improvement influences teaching practices over a period of time. In order to increase our understanding of the process of building school-wide capacity and the impact on teaching practices and student outcomes, more longitudinal research is needed.

This study builds on earlier work in which we examined the impact of leadership practices, organizational conditions and teacher motivation on teacher learning and classroom practice (Thoonen *et al.*, 2011a, 2012). The goal of this study was to increase our understanding of the impact of leadership practices and school improvement capacity on changing teachers' instructional practices[1]. Drawing on research on leadership practices, and school capacity building (e.g. Geijsel *et al.*, 2001; Kwakman, 2003; Leithwood and Jantzi, 2006; Little, 1990; Silins, 1994), we measured transformational leadership (i.e. vision building, individualized consideration and support and intellectual stimulation), school organizational conditions (i.e. participative decision making and teacher collaboration), teacher motivation (i.e. teachers' sense of

self-efficacy, and internalization of school goals into personal goals) and professional learning activities (i.e. keeping up to date, and experimenting and reflection). We examined the relationship between these variables and their impact on changed classroom practices by using data gathered over a four years (2005-2008) period of time from 862 teachers of 38 elementary schools.

In the next section, we will discuss the different perspectives scholars have used in their attempts to conceptualize school improvement and educational change and the methodological approaches used. We will then focus on the framework and related variables that guided our study, followed by a description of the method. After this description, we will present the results of our longitudinal study. In the last section, we will discuss the main findings and their implications.

Theoretical framework

In order to conceptualize school improvement and educational change, scholars have used a variety of theoretical perspectives (Sleegers and Leithwood, 2010). Studies into the implementation of externally initiated planned change efforts in education conducted in the 1970s have shown that many innovations in schools were abandoned and that the fundamental features of the reform programs were often modified through “mutual adaptation” (see for an overview Firestone and Corbett, 1988). Based on these results, scholars started to frame school improvement as a form of organizational change to better understand the complexity and dynamic nature of planned change efforts in education. As a consequence, the process of implementing changes in schools was modeled as overlapping developmental stages, including adaptation, implementation and institutionalization (Fullan, 1991; Miles, 1986). This line of inquiry has sought to describe and analyze processes that have an impact on successful change in schools, including studies that focus on personal change (Evans, 1996; Rogers, 2003), organizational change (O’Toole, 1995; Weick, 1976) and educational change (Hall and Hord, 2006; Sleegers *et al.*, 2002). The major emphasis was on identifying strategies of change, focussing on the effective management of change processes.

Scholars have also tried to gain more insight into factors that foster school improvement by focussing on a list of effective school improvement enhancing factors based on the knowledge base on effective teaching (Creemers, 1994), teacher development (Fullan and Hargreaves, 1992) and effective schools (Hallinger and Murphy, 1986; Purkey and Smith, 1983; Reynolds *et al.*, 2000; Scheerens and Bosker, 1997). From this line of research, a great deal of evidence and consistent themes have emerged about school and teaching effectiveness practices that suggest important areas for successful educational change and school improvement. As this research mainly focussed on the development of better information about “what works,” the issue of how to manage a change process by which schools may become more effective was less addressed (Louis *et al.*, 1999).

Another lens for exploring school improvement emerged from the literature on school and organizational culture. The first efforts derived from this perspective go back to the 1980s and focussed on how change challenged the underlying norms, values and beliefs in schools and how school culture shapes educational reforms (Sarason, 1982; Wolcott, 1977). More recently, efforts have linked school improvement to the constructs of learning organizations and professional learning communities (Leithwood and Louis, 1998; Louis *et al.*, 1996; Mitchell and Sackney, 2000). These studies often use a system theory on change that links structural, cultural and political

dimensions of school workplace environments to professional learning. Organizational conditions including leadership are considered as the main levers of a school's capacity to change and as a prerequisite for linking teachers' professional development to school development.

Since the No Child Left Behind legislation (US Congress, 2001), educational leaders and policy-makers in the USA have devoted much of their energy to creating so-called comprehensive school reform (CSR) models for improving the achievement of low-performing students that are "evidence-based." This design-based approach focusses on school improvement processes that are guided by pre-existing blue print of educational practices encompassing virtually all aspects of school operations, including instruction, assessment, classroom management, professional development, parental involvement, school management and curriculum. In this approach, local schools work together with outside agencies to implement new designs that stimulate instructional change and that can be replicated reliably and effectively in many settings (Rowan *et al.*, 2009).

Researchers have started to examine the success of the so-called CSR models by focussing on nature of problems being addressed by a social policy or program, the features and implementation strategy of the models and the social context in which the models are implemented (cf. Datnow *et al.*, 2002; Borman *et al.*, 2003; Rowan and Miller, 2007).

More recently, scholars have conceptualized school improvement as the interaction between the change process and the setting and examine the relationship between schools' contexts, leadership and improvement strategies during change (Day *et al.*, 2011; Hallinger and Heck, 2011). In this line of research, researchers try to describe and analyze different patterns or stages in the journey of school improvement and relate these patterns of growth of learning to contextual conditions. Special attention is paid to the link between leadership and organizational contexts that demonstrated low performing, as is the case with turn-around schools (Leithwood *et al.*, 2010; Nicolaidou and Ainscow, 2005).

Based on their review of research about the relationship between structural and cultural aspects of the school organization, teacher learning and change, Slegers and Leithwood (2010) identified two views that underlie the different perspectives and have dominated research on school improvement and educational change. The first view, which they term the "inside" view, focusses on the capacity of schools to transform themselves into supportive environments for teacher learning and change. In this view change is considered as part of a larger process of making sense of situations in which teachers work and live through individual and collective reflection on beliefs and practices. The second view, the "outside" view, concerns the implementation of external developed reform designs into schools. The "outside" view focusses on empirical-rational strategies for change which assume that teachers, as rational human beings, will implement changes in their classrooms which are demonstrated to improve student learning. In this view, teachers as mere recipients and consumers of new behavior, beliefs and programs of researchers, policy makers and educators outside the school.

Focussing on the capacity of schools to transform themselves into supportive environments for teacher learning and change, the inside view is represented by a wide range of studies about organizational learning, learning organization and professional learning communities (Bryk *et al.*, 1999; Hopkins, 2001; Leithwood *et al.*, 1999, 2001; Mitchell and Sackney, 2000; Slegers *et al.*, 2013; Toole and Louis, 2002; Vescio *et al.*,

2008; Lomos *et al.*, 2011). Results from these studies indicate that teacher learning is crucial for improving instructional practices and that school organizational conditions such as participative decision making, teacher collaboration, an open and trustful climate and transformational leadership can foster teachers' professional learning in schools. In addition, psychological factors such as personal teaching efficacy, teacher autonomy and perceived control and teachers' sense making also affect teachers' learning (Coburn, 2003; Kwakman, 2003; Richardson and Placier, 2001; Spillane *et al.*, 2002; van Veen and Slegers, 2006).

The outside view, concerned with the implementation of innovations or new practices developed by reformers and policy makers, is represented by studies into the effects of the school improvement by design approach, including CSR models and the transfer of these models to multiple settings ("scaling up"). Findings from these studies indicate that only some of the CSR models have modest effects on student achievements and that most of the effects do not sustain (Berends *et al.*, 2002; Borman *et al.*, 2003, 2005; Sterbinsky *et al.*, 2006; US Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service, 2010a, b). As a consequence, there is growing body of work that focusses on the conditions under which these models can be implemented successfully, the possibilities and boundaries of scaling up CSR models and the sustainability of these educational reforms (Borman *et al.*, 2004; Camburn *et al.*, 2003; Datnow *et al.*, 2002; Desimone, 2002; Klingner *et al.*, 2006; Mayer *et al.*, 2013; Rowan and Miller, 2007; Rowan *et al.*, 2009; Sterbinsky *et al.*, 2006; Sun *et al.*, 2013). Results of these studies show that most of the CSR reforms were actively shaped and reshaped ("co-constructed") by teachers, school leaders and other local educators to accommodate the various goals, materials and demands of the program to the local context. Furthermore, findings indicate that a more programmed approach to instructional change with strong press for instructional standardization and high levels of monitoring, collective distribution of leadership, sufficient resources and time and district support for the reform are important for the successful implementation. Moreover, the findings also seem to suggest that schools which already have a high school-wide capacity for improvement and are able to transform their organization into a rich learning environment for teachers can integrate externally developed reforms into their current practice far more easily than schools with a low improvement capacity. So, it is far easier to seed new practices successfully in schools which have fertile "soils" (Slavin, 1998).

Although inside and outside views on change use different assumptions about the nature and direction of school improvement and educational change, results of research show that they inform each other. Findings indicate that successful educational reform needs to be context specific, integrated with school-wide capacity for improvement and stimulate teacher learning in schools (Slegers and Leithwood, 2010). So, building school-wide capacity to improve teacher practice and enhance students' learning seems to be a key challenge for practitioners to cope with the current and growing pressure to change, including the push for strong terms of accountability and systematic reforms, and beliefs about the effectiveness of "evidence-based" decision making.

Methodological approaches

In spite of the awareness that improvement, by definition, entails change in state of schools over time, most of the literature on school improvement and educational change hardly describe change and improvement in schools (Hallinger and Heck, 2011;

Thoonen *et al.*, 2012). Case studies generated descriptions of what occurs during efforts to improve schools in other specific context, however, findings from cases studies cannot be generalized and research that relies on a knowledge base from case studies alone is of limited validity and utility. Large survey studies have broadened our understanding of effective conditions for school improvement. As these studies are mainly based on a cross-sectional design, they only offer a one-time snapshot of the state of the school's performance and, therefore, are not equipped to illuminate the effect of school internal conditions on changes in teachers' teaching practices over a period of time.

For developing substantive knowledge concerning the nature and dynamics of school improvement, we make a claim for longitudinal studies that provide pictures of schools over a period of time. Longitudinal data can increase our understanding of the nature of school improvement processes and outcomes in schools. Additionally, longitudinal data gain a better understanding of the patterns of change that occur across schools during the process of school improvement. Recently school improvement researchers began to conduct longitudinal studies on a scale that is capable of linking effective conditions for sustained improvement to teacher change (e.g. Heck and Hallinger, 2009; Mulford and Silins, 2003, 2009; Thoonen *et al.*, 2012). Few studies in the school improvement literature describe and try to understand the nature of changes in conditions for school improvement and its influence on changes in teachers' teaching practices over a period of time. Empirical studies using longitudinal data (Smylie and Wenzel, 2003; Thoonen *et al.*, 2012) have shown that organizational-level and teacher-level conditions for school improvement can vary over a couple of years. Moreover, there is variation between schools with respect to the development of these conditions. Even though these studies extend our insights into the development of conditions for school improvement and the impact for student growth in learning, there is still little systematic evidence for the claim that building school wide capacity to promote individual and collective learning affects teachers' instructional practices (see, e.g. Vescio *et al.*, 2008; Lomos *et al.*, 2011).

Focus of the present study

Framework

In this study, we examined variation in teaching practices over time and assessed the impact of building school improvement capacity. Building capacity for sustained improvement is seen as a mechanism that fosters changes in classroom practices. School-wide capacity for improvement refers to a set of conditions at school and teacher level that enable teachers' professional learning and support teaching and learning (Heck and Hallinger, 2009; Mulford and Silins, 2003; Slegers *et al.*, 2005; Stoll *et al.*, 2006). Our operationalization of school's capacity for sustained improvement is based on a general model of employee performance as developed in research on organizational and industrial policy (Rowan, 1996). The model assumes that variations in professional performance is a function of the capacities and motivations of workplace personnel, the characteristics of the organizational setting in which they work and the external social and political environment. Characteristics of the organizational setting in which the personnel works can be supportive for their capacities and motivation. Drawing on this model, Leithwood *et al.* (2002) have developed a framework that can help to guide research on large-scale reforms. Their framework suggests that variations in the success of large-scale reform can be explained in terms of their influence on educators' motivations and capacities, as well

as their work settings which facilitate the types of changes in schools, and especially the teaching practices needed for significant gains in whatever student outcomes are aspired to by reformers. The framework of Leithwood *et al.* (2002) has been confirmed by international evidence which suggests that educational reform's progress depends on teachers' individual and collective capacity and its link with school wide capacity for promoting pupils' learning (Leithwood *et al.*, 2004; Richardson and Placier, 2001; Smylie and Hart, 1999).

We used this framework and previous research on teacher learning and motivation, school's capacity building and leadership practices, to develop a model consisting of five general constructs (each with multiple aspects, covered by separate variables) and the relationships among these general constructs (see Figure 1). According to this model, it is assumed that transformational leadership, school organizational conditions, teacher motivational factors and teacher engagement in professional learning will change teachers' instructional practices. Transformational leadership and school organizational conditions will have indirect effects on instructional change through teacher motivation and teachers' engagement in professional learning activities.

Defining the concepts

As we aimed to increase our understanding of the impact of (aspects of) school improvement capacity on changing teachers' instructional practices, we measured school-wide capacity by using concepts and related variables of which previous research has showed to have an impact on instructional change. The following variables (between parentheses) embedded in four general concepts were used:

- (1) transformational leadership (i.e. vision building, individualized consideration and support and intellectual stimulation);
- (2) school organizational conditions (i.e. participative decision making and teacher collaboration);
- (3) teacher motivational factors (i.e. teachers' sense of self-efficacy, and internalization of school goals into personal goals); and
- (4) teacher engagement in professional learning activities (i.e. keeping up to date, and experimenting and reflection).

Transformational leadership. Leadership is widely regarded as playing a significant role in school effectiveness and school improvement (Leithwood *et al.*, 2008). In their efforts to assess the impact of leadership on building school wide capacity and promoting student learning, scholars have used specific sets of leadership activities covered by two dominant models, including instructional leadership, which is directly geared to the educational activities of the teachers, and transformational leadership, which aims primarily to enhance the commitment and competencies of teachers (Hallinger, 2003). Research has shown that leadership inspired by the concept of transformational leadership plays a significant role in building school wide capacity and educational change (Leithwood *et al.*, 1999). Numerous studies on transformational leadership in educational settings have demonstrated positive relationships between transformational leadership and various school and teacher organizational conditions (Leithwood and Jantzi, 2005; Leithwood and Sun, 2009). For example, studies have found increased participation in decision making and commitment to school improvement, as well as increased teachers' motivation to implement accountability policies. Transformational

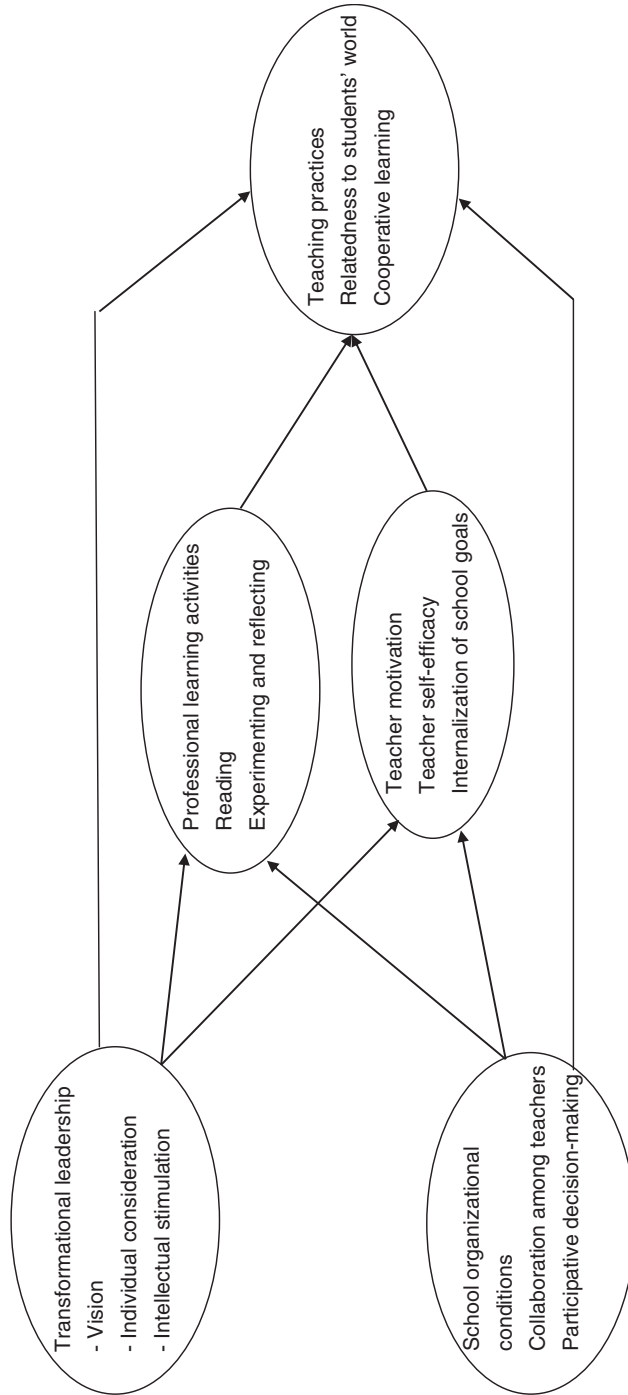


Figure 1. Conceptual model of the relations between leadership practices, school organizational conditions, teacher motivation, teachers' professional learning activities and classroom practices

leaders were found to be able to influence organizational members to move beyond self-interest in support of larger organizational goals. Moreover, transformational leadership has been associated with student outcomes, both directly and indirectly through these conditions (Leithwood and Jantzi, 2006; Leithwood and Sun, 2012). Although the importance of transformational leadership for reform-oriented school improvement is widely acknowledged, studies have not shown strong effects of transformational leadership on student achievement, especially when these effects are compared with the effects of instructional leadership on student outcomes (Robinson *et al.*, 2008). As this study focusses on instructional change, we used the concept of transformational leadership to measure the impact specific leadership activities may have on teaching practices. Based on findings of earlier studies, we identified three dimensions of transformational leadership in schools: vision building through initiating and identifying a vision for the school's future, providing individual support and providing intellectual stimulation (Geijsel *et al.*, 1999; Leithwood and Jantzi, 2006; Leithwood *et al.*, 1999; Nguni *et al.*, 2006).

Organizational conditions. In debates about school reform, more “organic” form of management, involving the developing of staff collaboration and participative decision making, is assumed to increase the commitment of the teaching staff and their identification with the school, which in turn will lead to improved teaching (Rowan, 1990). Cooperative, friendly and collegial relationships; open communication; and free exchange of ideas may provide emotional and psychological support for teachers' work and promote opportunities for critical reflection, experimentation and other types of learning (Geijsel *et al.*, 2001; Kwakman, 2003; Rosenholtz, 1991; Smylie *et al.*, 1996). Several studies have shown that teacher collaboration can have strong positive effects on teachers' professional learning and can, if it is focussed on student learning, help to improve classroom practices (Bryk *et al.*, 1999; Louis and Marks, 1998; Smylie, 1988; Rosenholtz, 1989; Stoll *et al.*, 2006).

Teacher participation in decision making, as a condition that supports an organic form of school organization, can add to personal goals and teachers' sense of self-efficacy and thus motivate teacher learning. Participation in decision making refers to joint decision making or shared influence in decision making by a superior and the employees. Participative decision making may increase teachers' ownership of organizational goals and can reinforce the extent to which teachers have internalized school goals and values as their personal goals (Sleegers *et al.*, 2005; Smylie, 1988; Smylie *et al.*, 1996). As such, this type of decision making may provide standards teachers can use to evaluate their own practice and may clarify instructional goals. Positive effects of participative decision making on teacher motivation have been found in several empirical studies (e.g. Jongmans *et al.*, 2004; Rowan *et al.*, 1993; Smylie *et al.*, 1996). Although research provides empirical support for the positive role organic forms of management, including staff collaboration and participative decision making, play in promoting instructional improvement in schools, research also suggest that positive effects appear to be contingent on conditions in and around schools and that support for direct effects of organic management on student outcomes are weak (Miller and Rowan, 2006).

Teacher motivation. According to Bandura's social cognitive theory (1977), human learning and functioning are explained in terms of a triadic reciprocity: individual behavior, cognitions and environmental conditions operate as interacting determinants of one another. One important construct in this theory, perceived self-efficacy, mediates learning and behavior. Self-efficacy is a future-oriented belief

about the competence a person expects to display in a given situation. Self-efficacy works in two related ways. First, it strengthens teachers in pursuing interests and involvement in activities through setting themselves challenges (Bandura, 1986; Geijsel *et al.*, 2009). Second, it takes away fear of failure and it strengthens persistence in pursuit of interests and goals (Runhaar, 2008). Research has shown that teacher efficacy positively influences teachers' engagement in professional learning activities and subsequently enhances the quality of the instruction (Geijsel *et al.*, 2009; Goddard *et al.*, 2000; Smylie, 1988; Tschannen-Moran and Woolfolk Hoy, 2001; Wheatley, 2002).

Motivational processes are a function of one's personal goals and of beliefs about one's capacities and one's context (Ford, 1992). Research on teacher commitment as a key aspect of a school-wide capacity for improvement has often suggested that a strong belief in and acceptance of the organization's goals and values, is an element of teacher motivation (Geijsel *et al.*, 2009; Leithwood *et al.*, 1999). A strong belief in and acceptance of school goals and values can motivate teachers to action if school goals and values are internalized as personal goals and values. Research has shown that teachers' internalization of school goals into personal goals influences their engagement in professional learning activities, both directly and via self-efficacy (Geijsel *et al.*, 2003; Leithwood *et al.*, 1999; Thoonen *et al.*, 2011a).

Teachers' engagement in professional learning activities. Inspired by adult learning theories and situated cognitive perspectives on learning, researchers have emphasized the notion of on-going and life-long professional learning embedded in schools as a natural and expected component of professional activities of teachers and a key component to improve the quality of instruction and school improvement (Clarke and Hollingsworth, 2002; Jarvis, 1987; Kwakman, 2003; Putnam and Borko, 2000; Slegers *et al.*, 2005; Smylie, 1995). From this perspective, the focus of teacher learning is on teachers' engagement in a variety of professional learning activities within schools and on becoming a participant in a community of learners (Sfard, 1988; ten Dam and Blom, 2006). Scholars distinguished different professional learning activities that are crucial for enabling teachers to deal with the rapid changes with which they are faced, such as keeping up to date, innovation, experimentation and reflective practice (Geijsel *et al.*, 2009; Kwakman, 2003; Lohman and Woolf, 2001; Smylie, 1995). Research has shown that active learning (observing, discussion, planning, feedback, reflection) and enhancing knowledge (study group, conference, etc.) affect teaching practice (Garet *et al.*, 2001; Geijsel *et al.*, 2001; Runhaar, 2008; Supovitz, 2002).

Teaching practices: instructional strategies. Based on constructivist approaches to teaching, scholars and researchers have stressed the need for creating learning environments that stimulate self-regulated and active learning, acknowledge differences between students and are connected to authentic and real-life contexts (Blok *et al.*, 2006; de Kock *et al.*, 2004; Shuell, 1996). Recently, Scheerens (2008) has conducted a meta-analysis into instructional and school effectiveness in which the effects of both "traditional" and constructivist approaches to teaching were analyzed. The results showed that constructivist-oriented instructional strategies had the biggest effect on student outcomes. In addition, Thoonen *et al.* (2011b) found that instructional strategies based on constructivist approaches to teaching can explain variation in student motivation, in particular the extent to which teachers related their instruction to students' world, and students are stimulated to learning cooperatively.

Contemporary research on school improvement has identified above mentioned factors at the level of the teacher and the organization as effective conditions for changing teaching practices (e.g. Geijsel *et al.*, 2009; Kwakman, 2003; Leithwood and Jantzi, 2006; Smylie and Hart, 1999; Thoonen *et al.*, 2011a).

In this study we examined changes in teachers' instructional practices and used a model of school internal conditions to explain these changes and to gain insight into the relationships among school internal conditions over a period of time. Based on our framework (see Figure 1) and the available evidence from previous research mentioned above, we expect that teacher-level conditions (teachers' engagement in professional learning activities and teacher motivation) will have a more direct impact on changing teachers' classroom practices than school-level conditions. In addition, we expect that organization-level conditions (transformational leadership dimensions, teacher collaboration and participative decision making) positively affect teachers' motivation and the extent to which they are engaged in professional learning activities.

Method

Sample

The study described in this paper is part of a longitudinal survey on school improvement in elementary education. Participants were teachers from 32 elementary schools (students at the age of four to 12 years), situated in the country as well as in and around two cities (> 150,000 citizens) in the Netherlands. The 32 schools differed by background characteristics (denomination, number of pupils and teachers, percentage pupils with low SES) and are comparable to other schools in the country and cities (see Appendix, Table AI). The implementation of more responsive forms of accountability in the Netherlands, as mentioned above, has challenged the school boards in this study to stimulate school leaders and teachers to strengthen and develop their school-wide capacity for continuous improvement as was expected by policy-makers. To create instructional change, the school boards used an adaptive approach to instructional change by not prescribing specific programs or designs but by giving school leaders and teachers enough discretion and autonomy to change classroom practices (Berman and McLaughlin, 1975; Rowan and Miller, 2007). In order to monitor school-wide capacity for continuous improvement, schools in the sample were recommended by their school boards to participate in the study.

In 2005 we started with teachers from 18 elementary schools, after which we succeeded to extend our sample to 32 schools. The additional 14 elementary schools entered the study after the first year of the study (2006). In the first year (2005) 283 teachers participated, in the second year (2006) 673 teachers, in the third year (2007) 479 teachers and finally in the fourth year (2008) 480 teachers participated in our longitudinal study. As in most longitudinal studies, this project suffered from dropout of teachers. Although the sample is supplemented with new teachers at every measurement, the number of teachers available for longitudinal analyses decreases with every successive measurement occasion in the project. Most teacher loss has to do with moving to another school, retirement and non-response at one or more measurement occasions; in some cases teachers became a member of the school management. After four measurement occasions, we have at our disposal longitudinal data on 867 teachers in 32 schools. An overview of the frequency of teachers' participation in the survey for the different waves of data (one to four times), can be found in the Appendix (Table AII).

Measures

In this longitudinal study we used the revised version of the Dutch School Improvement Questionnaire for teachers (Thoonen *et al.*, 2011a). The concepts used in this study were operationalized and measured based on existing scales and items, as well as newly formulated items. Teachers indicated the extent to which the item content applied to them on four-point scales (1 = does apply to me (almost) never, 2 = does apply to me sometimes, 3 = does apply to me often, 4 = does apply to me (almost) always). The items in the questionnaire referred to the above-mentioned concepts (see Appendix for an overview of the scales and related items).

With regard to transformational leadership three dimensions of transformational leadership, including vision building, providing individualized consideration and providing intellectual stimulation were measured (cf. Geijsel *et al.*, 2001; Leithwood *et al.*, 1993; Silins, 1994). Vision building referred to the extent to which the school leader initiates and identifies a vision for the school's future. This scale consisted of five items ($\alpha = 0.88$) [2]. Individualized consideration was defined as the extent to which the school leader, acknowledging teachers' efforts, provides individualized support for teachers and was measured using four items ($\alpha = 0.91$). The third scale, providing intellectual stimulation, consisted of eight items ($\alpha = 0.92$) and concerned the degree to which the school leader provides teachers with intellectual stimulation.

With respect to the organizational conditions, teachers' participation in decision making and collaboration among teachers were measured. Participative decision making was defined as the extent to which teachers experience that they participate in processes and outcomes of the school's decision making regarding issues of education, innovation and school improvement (cf. Geijsel *et al.*, 2001; Jongmans *et al.*, 2004). The scale consisted of eight items ($\alpha = 0.89$). Teacher collaboration referred to the extent to which teachers experience professional collaboration that extends the level of exchanging information and offers opportunities to learn from each other (cf. Geijsel, 2001; Little, 1990). The scale consisted of seven items ($\alpha = 0.82$).

Teacher motivation referred to teachers' sense of self-efficacy and the internationalization of organizational goals into personal goals. Teachers' sense of self-efficacy referred to the degree to which teachers experience a sense of self-efficacy with regard to their own professionalism (van Woerkom, 2003). This scale consists of five items ($\alpha = 0.81$). Personal goals was defined as the extent to which teachers have internalized the goals and vision of the school as their personal goals (five items; $\alpha = 0.82$).

Teachers' engagement in professional learning activities was measured by focussing on two learning activities: keeping up to date and experimenting and reflection. Keeping up to date refers to the extent to which teachers keep up with developments in the field of education by reading professional literature and undertake other activities (cf. Geijsel *et al.*, 2001; Kwakman, 2003). This scale consisted of five items ($\alpha = 0.79$). Experimenting and reflection concerned the extent to which teachers try out new things and/or undertake action explicitly meant to improve their practices and/or enable reflection on their practices (cf. Geijsel *et al.*, 2001; Kwakman, 2003). This scale consisted of seven items ($\alpha = 0.79$).

Teachers' instructional practices. Based on theories on motivation and learning and findings from our earlier research on the impact instructional strategies based on constructivist approaches of teaching have on student motivation (Thoonen *et al.*,

2011b), we distinguished two instructional strategies. The extent to which teachers relate the instruction to students' personal world (three items; $\alpha = 0.73$) and the degree to which the teacher promotes cooperation and interaction between students (four items; $\alpha = 0.76$).

Analyses

In the four years of data collection, 2005 through 2008, some teachers dropped out of the study (e.g. because they missed a measurement occasion or because they left their job), whereas other teachers entered the study some years after its start (e.g. because they changed schools or because they were teaching at one of the schools that entered the study in 2006). In order to take the different patterns of missingness into account and still make use of all available data, we applied multilevel regression analysis (procedure Mixed, SPSS version 15, SPSS Inc., 2006) to answer our research questions. In the multilevel analysis of the hierarchical longitudinal data we distinguished three levels: measurement occasions (level 1), nested with teachers (level 2) nested within schools (level 3).

In preliminary analyses we compared various multilevel models for the longitudinal covariance structure (compound symmetry and autoregression structures, with homogenous and heterogeneous variances), using information criteria and χ^2 tests of differences in fit with the unstructured models. We found that the longitudinal covariance structure was generally best described as autoregressive with homogenous variances. We further checked whether it was necessary to account for possible differences in means, variances and covariances of the outcome measures between the 14 schools that entered the study and the 18 schools that participated from the beginning, but χ^2 tests did not show any significant differences in fit between models with and models without additional parameters for new schools.

We first investigated change over time in the research variables by fitting multilevel models to teachers' scores on each of the four measurement occasions (descriptive data for the different constructs over time can be found in Appendix, Table AIII). These so-called "fixed occasion" models (Snijders and Bosker, 1999) consisted of a random intercept representing the mean scores at the first measurement and three fixed regression coefficients for each of the three subsequent measurement occasions, representing the deviations from the scores at the first measurement occasion. The random intercept is associated with between-school variance (level 3), between-teacher variance (level 2) and within-teacher variance (level 1; level 2 and level 1 variances are functions of the auto-correlation coefficient).

Second, to test our expectations, we successively examined the effects of organizational-level conditions (dimensions of transformational leadership, teacher collaboration and participative decision making) and teacher's background variables on teacher-level conditions (teachers' sense of self-efficacy, their internalization of school goals into personal goals and engagement in professional learning activities), as well as the effects of these explanatory variables on changes in classroom practices. By investigating the relations between these variables in this order, the analyses yield insight into the effects of organizational-level conditions on changed classroom practices, and to which extent these effects are mediated by teacher-level conditions.

Finally, in order to investigate whether the effects were consistent over a period of three years, we also tested the significance of interaction of the explanatory variables with time. We then removed the non-significant interaction effects one-by-one but we retained all main effects even not significant as we did not have specific hypotheses

concerning the main effects. By retaining the main effects we respected the everyday school context in which practically exists a mix of school internal conditions.

Results

In this section we successively report the results of the longitudinal mixed-models of teacher-level conditions predicted by organizational-level conditions and teacher's background variables, and the results of the longitudinal mixed-models of teachers' instructional strategies predicted by organizational-level and teacher-level conditions and teacher's background variables. We first present changes of teacher-level conditions over time, and the main and interaction effects of organizational-level conditions. Second, we report the effects of time, organizational-level and teacher-level conditions on change in teacher's teaching practices.

Standardized parameter estimates for longitudinal mixed-models of teacher motivation and teachers' professional learning predicted by organizational-level conditions and teacher's background variables are reported in Table I. The explained variances within and between teachers in the empty model were 44.3 percent and 55.7 percent for teachers' sense of self-efficacy, 45.3 and 54.7 percent for personal goals, 31.5 and 68.5 percent for keeping up to date and 36.2 and 63.7 percent for experimenting and reflecting. Furthermore, the findings showed that organizational-level variables explained less variance in teachers' sense of self-efficacy and teachers' engagement in professional learning activities to keep themselves up to date (9.4 percent, respectively 17.1 percent) than variance was explained in the extent to which teachers internalize school organizational goals into personal goals and are engaged in professional learning activities to experiment and reflect (37.3 percent, respectively 25.2 percent).

As the results in Table I show, teachers' sense of self-efficacy and teachers' engagement in professional learning activities to experiment and reflect significantly increased over a period of time. After two and three years (T3 and T4), teachers experienced more sense of self-efficacy with regard to their own professionalism and were more engaged in experimenting and reflecting activities in comparison with the beginning of our study. The average scores of personal goals and teachers' engagement in professional learning activities to keep themselves up to date did not show a significant longitudinal development.

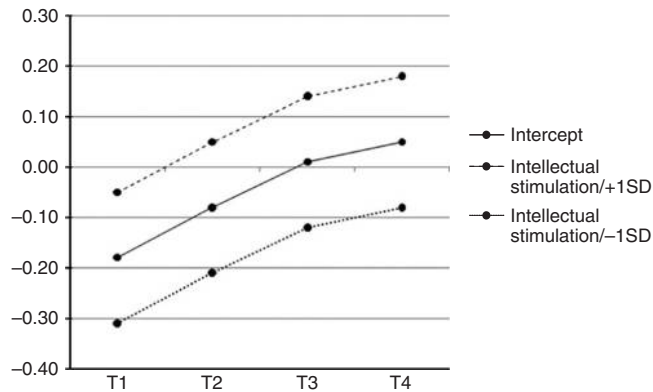
Main effects of explanatory variables were found on each of the teacher motivation and professional learning variables. With respect to teachers' sense of self-efficacy, we see main effects of the intellectual stimulation dimension of transformational leadership (0.13), teacher collaboration (0.09) and participative decision making (0.11). The more teachers are stimulated intellectually, experience a collaborative culture and participate in decision-making process, the higher teachers' sense of self-efficacy regarding their own professionalism. Facilitating the interpretation for different scenarios, Figure 2 shows the mean scores for each of the four measurement occasions for a person who scored one standard deviation higher than the average on the explanatory variable intellectual stimulation.

Figure 2 shows that the sense of self-efficacy of a teacher who scored one standard deviation higher than the average score of the intellectual stimulation dimension of transformational leadership, significantly increased over a period of three years from -0.05 at the first measurement occasion (T1) to 0.18 at the fourth measurement occasion (T4). The scores of teachers' sense of self-efficacy of a teacher who scored

Fixed effects	Teachers' sense of self-efficacy	Personal goals	Professional learning: keeping up to date	Professional learning: experimenting and reflection
<i>Measurement interval, no. of teachers</i>				
Intercept (T1)	-0.18 (0.06)	0.00 (0.08)	-0.03 (0.06)	-0.04 (0.06)
After 1 year	0.10 (0.06)	0.03 (0.07)	0.08 (0.05)	0.02 (0.06)
After 2 years	0.19* (0.06)	-0.09 (0.08)	0.08 (0.05)	0.18* (0.06)
After 3 years	0.23* (0.06)	-0.02 (0.08)	0.10 (0.06)	0.17* (0.06)
<i>Teacher background</i>				
Gender	0.07 (0.08)	-0.10 (0.07)	-0.09 (0.08)	-0.22* (0.08)
Experience in elementary education at T1	0.02 (0.04)	0.11* (0.03)	0.23* (0.04)	-0.02 (0.43)
Experience in school at T1	0.03 (0.04)	0.02 (0.03)	-0.10* (0.04)	-0.11* (0.04)
<i>Transformational leadership</i>				
Vision building (baseline)	-0.05 (0.03)	0.26* (0.06)	0.01 (0.03)	-0.05 (0.03)
Deviation from baseline after 1 year (T2)	-	0.01 (0.07)	-	-
Deviation from baseline after 2 years (T3)	-	0.19* (0.07)	-	-
Deviation from baseline after 3 years (T4)	-	0.02 (0.07)	-	-
Individualized consideration	0.03 (0.03)	-0.00 (0.03)	-0.04 (0.03)	-0.12* (0.03)
Intellectual stimulation	0.13* (0.03)	-0.03 (0.03)	0.18* (0.03)	0.24* (0.03)
<i>School organization</i>				
Teacher collaboration	0.09* (0.02)	0.09* (0.02)	0.06* (0.02)	0.26* (0.02)
Participative decision-making (baseline)	0.11* (0.03)	0.30* (0.06)	0.07* (0.03)	0.03 (0.03)
Deviation from baseline after 1 year (T2)	-	-0.09 (0.07)	-	-
Deviation from baseline after 2 years (T3)	-	-0.23* (0.07)	-	-
Deviation from baseline after 3 years (T4)	-	-0.08 (0.07)	-	-
Percentages of explained variances by fixed effects (full model)	9.4	37.3	17.1	25.2
Total number of observations in analysis				

Notes: $n = 862$. Gender: 0 = men, 1 = women. * $p < 0.05$.

Table I.
Standardized parameter estimates for longitudinal mixed-models of teacher motivation and teachers' professional learning predicted by organizational-level conditions and teachers' background variables



Notes: The solid line represents the standardized estimates of deviations from the overall mean of teachers' sense of self-efficacy for a theoretical female person that scored 0 on each endogenous variable. The scores of a person who scored one standard deviation higher respectively lower than the average on intellectual stimulation are plotted as a dashed respectively dotted line. Concerning the dashed line, at T1 this person scored -0.05 (see also Table I): the intercept of sense of self-efficacy at T1 (-0.18) plus the effect of intellectual stimulation at T1 (0.13). At T2 this person scored 0.05 : the intercept of sense of self-efficacy at T1 (-0.18), plus the main effect of time at M2 (0.10), plus the effect of intellectual stimulation at T1 (0.13)

Figure 2. Standardized estimates of deviations from overall mean over time: teachers' sense of self-efficacy

one standard deviation lower than the average score of intellectual stimulation also increased from -0.31 at T1 to -0.08 at T4. Because there are no interaction effects, the dashed and dotted lines are strictly parallel to the solid line.

With respect to teachers' internalization of school organizational goals into personal goals, the vision building dimension of transformational leadership and participative decision making did have the greatest effects (0.26 , respectively 0.30). Disregarding the interaction effects, the more school leaders initiate and identify a vision and teachers participate in decision-making process, the more teachers have internalized the goals of the school as their personal goals.

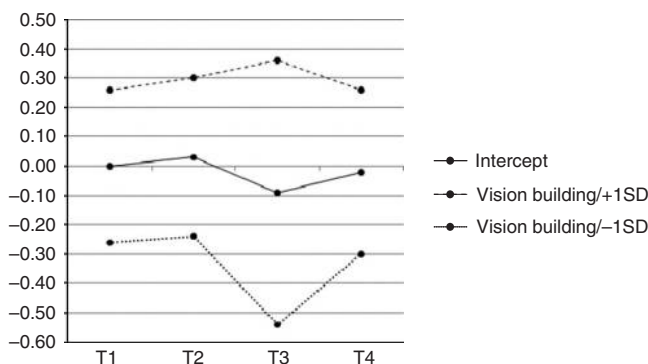
Teachers' engagement in professional learning activities was strongly affected by the intellectual stimulation dimension of transformational leadership and collaboration among teachers. The more school leaders stimulate teachers to professionalize themselves and the more teachers collaborate, the more teachers are engaged in professional learning activities to keep themselves up to date and to experiment and reflect. Furthermore, the results showed that the individualized consideration and support dimension of transformational leadership had a negative small direct effect on experimenting and reflecting (-0.12). More support and consideration seems to inhibit teachers' engagement in professional learning activities. Additionally, teachers' background in terms of experience in school seemed to negatively affect teachers' engagement in professional learning activities. Finally, it appeared that vision building

and individualized consideration also had non-significant (main) effects on (different aspects of) teacher motivation and teachers' engagement in professional learning activities and that the found direction does not always support the direction of these effect as expected in our study.

All together, considering the main significant effects of explanatory variables on teacher motivation and professional learning, it appeared that the intellectual stimulation dimension of transformational leadership and teacher collaboration are the most important predictors for teachers' motivation and engagement in professional learning activities. Moreover, our results suggested that vision building and participative decision making seem to be important for teachers' internalization of school organizational goals into personal goals.

As mentioned above, we also investigated whether the effects were consistent over a period of three years by testing the significance of interaction of the explanatory variables with time (see Table I). The results show that, next to main effects, we only found interaction effects of vision building and participative decision making with time.

To illustrate these interaction effects we have taken vision building as an example. In Figure 3 interaction effects have been plotted for a teacher who scored one standard deviation higher on vision building than the average score (dashed line) as well as a teachers who scored one standard deviation lower than the average score (dotted line). According to the dashed line, the figure shows that the internalization of schools goals into personal goals of a teacher who scored one standard deviation higher than the average score of the vision building dimension of transformational leadership



Notes: The solid line represents the standardized estimates of deviations from the overall mean of internalization of school goals into personal goals for a theoretical female person that scored 0 on each endogenous variable. The scores of a person who scored one standard deviation higher respectively lower than the average on vision building are plotted as a dashed respectively dotted line. Concerning the dashed line, at T1 this person scored 0.26 (see also Table I): the intercept of internalization of school goals into personal goals at T1 (0.00) plus the effect of vision building at T1 (0.26). At T2 this person scored 0.30: the intercept of personal goals at T1 (0.00), plus the main effect of time at M2 (0.03), plus the sum of the main and interaction effect of vision building (0.27)

Figure 3. Standardized estimates of deviations from overall mean over time: internalization of school goals into personal goals

significantly increased over a period of two years from 0.26 at the first measurement occasion (T1) to 0.36 at the third measurement occasion (T3). After three years (T4), the extent to which these teachers have internalized school goals was equal to the first year (0.26). Moreover, a teacher who scored one standard deviation lower on vision building had internalized less school goals into personal goals after three years (−0.54 at T3) than he or she had at the first measurement occasion (−0.26 at T1); notwithstanding the increase at the second (−0.24 at T2) and fourth measurement occasion (−0.30 at T4).

Table II presents the standardized parameter estimates for longitudinal mixed-models of teachers' instructional strategies predicted by organizational-level and teacher-level conditions and teacher's background variables. The explained variances within and between teachers in the empty model were 54.6 and 45.4 percent for relatedness to students' world and 51.3 and 48.7 percent for cooperative learning. The findings showed that both relatedness to students' world and cooperative learning showed significant negative effects of time. The relatedness to students' world negatively developed after the first measurement occasion (from 0.53 at T1 to −0.08 at T2; 0.53–0.61) followed by a steady neutral development (−0.08 and 0.02 after two respectively three years). Cooperative learning was less stimulated by teachers at the second, third and fourth measurement occasion than they did at the first measurement occasion.

Fixed effects	Teaching practices: relatedness to students' world	Teaching practices: cooperative learning
<i>Measurement interval, no. of teachers</i>		
Intercept (T1)	0.53 (0.06)	0.35 (0.07)
After 1 year	−0.61* (0.06)	−0.40* (0.07)
After 2 years	−0.61* (0.06)	−0.41* (0.08)
After 3 years	−0.51* (0.06)	−0.45* (0.08)
<i>Teacher background</i>		
Gender	−0.23* (0.07)	0.06 (0.07)
Experience in elementary education at T1	0.04 (0.04)	0.07* (0.04)
Experience in school at T1	−0.00 (0.03)	0.01 (0.03)
<i>Transformational leadership</i>		
Vision building	0.05 (0.03)	−0.01 (0.03)
Individualized consideration	−0.00 (0.03)	−0.07* (0.03)
Intellectual stimulation	−0.06 (0.03)	0.04 (0.03)
<i>School organization</i>		
Teacher collaboration	0.05* (0.02)	0.06* (0.02)
Participative decision-making	0.06* (0.03)	0.06* (0.03)
<i>Teacher motivation</i>		
Teachers' sense of self-efficacy	0.13* (0.02)	0.09* (0.02)
Personal goals	0.09* (0.02)	0.10* (0.02)
<i>Professional learning activities</i>		
Keeping up to date	0.09* (0.02)	0.13* (0.02)
Experimenting and reflection	0.22* (0.03)	0.23* (0.03)
Percentages of explained variances by fixed effects (full model)		
Total number of observations in analysis	25.2	29.1

Notes: *n* = 862. Gender: 0 = men, 1 = women. **p* < 0.05

Table II. Standardized parameter estimates for longitudinal mixed-models of teachers' classroom practices predicted by organizational-level and teacher-level conditions and teachers' background variables

Further, regarding the relatedness to students' world, several main effects were found of which teachers' sense of self-efficacy (0.13) and experimenting and reflection (0.22) had the most impact. Thus, the higher teachers' sense of self-efficacy and the more teachers are engaged in experimenting and reflecting, the more teachers relate their instruction to students' world. Moreover, female teachers related their instruction less to students' world than male teachers did (-0.23). With respect to cooperative learning, of the main effects found, keeping up to date (0.13) and experimenting and reflection (0.23) had the most impact. The more teachers were engaged in these professional learning activities, the more they promote cooperation and interaction between students.

Altogether, teachers' classroom practices seemed mainly affected by teacher-level conditions (the engagement in professional learning activities and teacher motivation). Teachers who have a high sense of self-efficacy and are engaged in professional learning activities to keep themselves up to date and to experiment and reflect, show more teaching practices in which the instruction is related to students' personal world and cooperation and interaction among students is stimulated. Organization-level conditions seemed to have a facilitating role regarding the relationship between teachers' classroom practices and teacher-level conditions.

Conclusions and discussion

In this study, we examined changes in teachers' instructional strategies over a period of three years and used a model of school internal conditions to explain these changes. Based on constructivist approaches to teaching and findings from one of our earlier studies, we distinguished two instructional strategies: relatedness to students' world and cooperative learning. Based on findings of empirical studies on school internal conditions that promote individual and collective learning and changes in teachers' classroom practices, we distinguished organizational-level conditions and teacher-level conditions and assessed the relations among these conditions and the instructional strategies teachers use. We applied multilevel regression analysis on hierarchical longitudinal data consisted of teachers' scores on four measurement with a sample from 862 teachers of 32 Dutch elementary schools. In this section, we discuss our most important findings. We first discuss our findings with respect to changes in the instructional strategies teachers use, and the effects of organizational-level conditions and teacher-level conditions on these changes. Next to these findings, we discuss the most important findings concerning the role of organizational conditions for the improvement of teacher conditions.

First, our data showed that teachers' classroom practices changed over time. On average, the extent to which teachers use instructional strategies based on constructivist approaches changed over a period of three years, however, after three years teachers paid less attention to relatedness to students' world and cooperative learning than they did at the beginning. This development especially took place after the first year of the study. From the second year of the study, teachers succeed in sustaining their teaching practices. In interpreting this finding, we would like to emphasize that the goal of this study was to increase our understanding of the role enhancing capacity building (at the school and teacher level) may play in explaining changes in teachers' instructional practices. An important point, however, is that in doing so, we are not evaluating whether teachers changed their instructional practices toward "better" teaching practices or some desired ends (in terms of student outcomes) or to what extent teachers have implemented a preferred instructional regime (i.e. instructional strategies based on constructivist approaches). For this

reason, we make no claims about the effects organizational-level and teacher-level conditions on student learning or the successful implementation of external developed designs or programs.

At first instance, a possible explanation for this finding may be the entrance of new schools (in our sample) after the first year of the study, though, we checked whether it was necessary to account for possible differences in means, variances and co-variances of the outcome measures between the 14 schools that entered the study and the 18 schools that participated from the beginning. χ^2 tests did not show any significant differences in fit between models with and models without additional parameters for new schools.

The changes in instructional practices may also be explained by the different frames of reference respondents may have when answering the questionnaire (Oort *et al.*, 2009). The observed differences between respondents' test scores at different measurement occasions may reflect something other than true differences. The measurement of changed instructional strategies can bring about the additional problem that teachers may also change their frame of reference, rendering scores from different measurement occasions incomparable. A changed frame of reference may cause "response shift." With response shift, observed changes in respondents' test scores may reflect something other than true changes in the attribute that we want to measure. Golembiewski *et al.* (1976) applied "response shift" in the field of organizational change and introduced the terms α , β and γ change to refer to actual change, change in internal standards and reconceptualization. The reported changes in teachers' instructional strategies may represent β or γ change instead of actual change. Over a period of time, teachers may have changed their internal standards (β change) or redefined their targets (γ change) toward constructivist-oriented approaches to teaching. Due to β and γ change teachers may become more critical about their teaching practices.

Another plausible explanation could be the changing political and social context in the Netherlands during the study, including the earlier mentioned accountability pressures and the social discussion concerning the more traditional teaching practices at schools that aroused at the beginning of this era (Blok *et al.*, 2006; Oostdam *et al.*, 2007). With regard to the latter issue, antagonists of constructivist teaching approaches emphasized views of learning as an active, social and independent process of knowledge-construction instead of the transmission of knowledge by teachers. These modern views of learning were labeled with the term "new learning." New learning initiatives criticized current teaching practices that were mainly based on traditional views of learning. Notwithstanding the different initiatives that tried to implement a combination of traditional and constructivist approaches to teaching in order to stimulate active, social and independent learning, the media often paid attention to extreme initiatives that strongly emphasize the autonomy of students to decide how to spend their time at school (cf. Sudbury Valley Schools). As the media labeled these extreme illustrations of "new" learning negatively in terms of "playgrounds" were students learn nothing, teachers, school leaders, parents and other stakeholders adopted a critical attitude toward so-called new learning initiatives in general. This critical attitude might have hindered schools and teachers to change their classroom practices into more constructivists' approaches to teaching.

The findings also show that teachers' factors mainly affect changes in teachers' classroom practices. Of the teacher-level conditions measured in our study, teachers' engagement in professional learning activities appeared to have the strongest effects. The engagement of teachers in professional learning activities, and in particular

experimentation and reflection, seems to stimulate teachers to change their teaching. This finding supports the notion of teacher change as a complex process that involves learning (Clarke and Hollingsworth, 2002). Teachers can be considered as active learners shaping their professional growth through reflective participation in everyday practice.

Next to teachers' engagement in professional learning activities, teacher motivation appeared to play a considerable role in changing teachers' instructional practices. This result corresponds with findings from earlier studies into the role of teachers' sense of self-efficacy for educational change (Bandura, 1997; Dembo and Gibson, 1985).

We also tested the role of organizational-level conditions including transformational leadership practices, teacher collaboration and participative decision making for the improvement of teacher-level conditions. Our findings support the assumption that organizational-level conditions have an impact on teacher motivation and teachers' engagement in professional learning activities. Most of the variance in teacher motivation is explained by participative decision making. The participation of teachers in decision-making processes increases their sense of self-efficacy and, in particular, the extent to which they internalize school goals into personal goals. The latter effect seemed to change over time: the extent to which teachers internalize school goals as a result of their participation in decision-making processes varies over a period of time. Teachers appear to desire greater influence in those areas that are related teaching and student learning. Empowerment should therefore focus on decisions that affect school policies that are broader than single classrooms but still clearly related to the improvement of learning environments to increase teachers' ownership of organizational goals (Geijsel *et al.*, 2001). It might be the case that, during the four years of our study, the decision-making process did not always focus on decisions that are strongly related to teaching and student learning but also on decisions that affect the administrative domain of school's policy-making, such as timetabling, division of tasks, relations with external organizations, teacher appraisal, etc. This may explain the found effects.

Next to participation in decision making, the findings also suggest that transformational leadership practices stimulate teachers' motivation. Stimulating teachers to professionalize themselves positively affect teachers' sense of self-efficacy. As earlier studies have shown (e.g. Geijsel *et al.*, 2003; Leithwood *et al.*, 1999; Nguni *et al.*, 2006), our results also confirm the significant role of vision building for the internalization of school goals into personal goals. By initiating and identifying a vision, school leaders reinforce the personal and social identification of followers with the organization and thus increase collective cohesion. As a consequence, teachers may feel more committed and are more willing to internalize organizational goals and values as their personal goals. Vision thus plays an important role in stimulating the commitment of teachers to organizational goals. A closer examination of our findings show that this relationship changed over time: initiating and identifying a vision appeared to have differential effects on the internalization of school goals over a period of time. Differences between "strong" and "weak" schools in the extent to which teachers internalize school goals can increase over a period of time. This seems to suggest that school leaders need to build a sustainable vision for lasting personal and social identification.

Most of the variance in teachers' engagement in professional learning activities was explained by the intellectual stimulation dimension of transformational leadership. Stimulating teachers to professionalize themselves positively affect teachers' engagement in activities to keep them up to date and to experiment and reflect.

The provision of financing, time and space, thus, enhances the extent to which teachers collect new knowledge and keep up to date and experiment with new insights and developments.

Although these findings support the claim that school leaders make modest contributions to staff capacities and performance (e.g. Bruggencate *et al.*, 2012; Leithwood *et al.*, 2008; Leithwood and Jantzi, 2006), the results also showed that individualized consideration and support may harm the engagement of teachers in experimenting and reflection activities. Teacher's feelings, opinions and needs can be rather different from or even hinder the direction of change and organizational goals. Showing concern and respect of school leaders for teacher's emotions may be interpreted by teachers as a tacit agreement of current classroom practice and, therefore, may discourage teachers to engage in experimenting and reflection activities.

Next to leadership, teacher collaboration seemed to be also an important facilitator for teachers' engagement in experimenting and reflection activities. By offering teachers the opportunities to work together to solve problems and to provide feedback and information, collaboration stimulates the extent to which teachers experiment in their classroom with new materials, try out new things and reflect on their current teaching. This finding confirms results of earlier studies (e.g. Bryk *et al.*, 1999; Geijsel, 2001; Louis and Marks, 1998; Rosenholtz, 1989; Smylie, 1988; Stoll *et al.*, 2006).

Based on our findings, it can be concluded that organizational-level conditions and teacher level conditions play an important, but different role in changing teachers' classroom practices. Whereas teacher factors mainly affect changes in teachers' classroom practices, organizational factors are of significant importance to enhance teacher motivation and teacher learning. By encouraging teachers to question their own beliefs, assumptions and values, and facilitating opportunities for teachers to work together to solve problems, school leaders can enhance teachers' engagement in professional learning activities. Furthermore, through the initiation and identification of a vision, and the promotion of shared decision making, school leaders can reinforce the personal and social identification of teachers with the organization. As a consequence, teachers will feel increasingly committed and are more willing to internalize organizational goals and values as their personal goals.

School leaders can use the findings from this study and the related instrument as a tool for school self-evaluation. By gathering and utilizing data about leadership practices, school organizational conditions, teacher motivation and teacher learning, school leaders can gain insight into school improvement capacity and become data literate (Geijsel *et al.*, 2010). How school leaders make sense of this information strongly shapes their responses to accountability pressures, the way they frame daily problems and articulate possible solutions and strategies aimed at enhancing the quality of their school (Sleegers *et al.*, 2009). This may help them to select, for example, a more programmed approach to instructional change with strong press for instructional standardization and high levels of monitoring instead of the adaptive approach to instructional change as used by the school boards of the schools that participated in this study. For findings from studies focussing on the conditions under which school improvement by design approach can be implemented successfully do suggest that such a more programmed approach to instructional change may promote instructional change and enhance student learning (Rowan and Miller, 2007; Rowan *et al.*, 2009).

Although schools appear to be capable to sustain their level of school improvement capacity, our results also show that schools do not succeed to raise their capacity for

improvement to higher levels. Hence, on an average, the difference between schools with high and low improvement capacity remained the same throughout the period of our study. More longitudinal research is needed to gain better insight into the opportunities and limits of building school-wide capacity to stimulate instructional change.

Limitations and future directions

While we believe that this study makes a unique contribution to increase our understanding of the role of school-wide capacity for improvement can play in changing teaching practices, we also acknowledge its limitations. In this section we discuss these limitations and suggest directions for future research.

A first limitation of our study is that we used perceptions of teachers to measure teaching practices. Whereas teacher reports are sometimes considered to be biased by self-serving strategies or teaching ideals, student ratings are occasionally criticized as being undifferentiated and easily influenced by personal preferences. An examination by Kunter and Baumert (2006) of the construct and criteria validity of student and teacher ratings as indicators of teacher instruction showed that student and teacher ratings are best suited to tapping different aspects of the learning environment. Both perspectives seem to provide valuable insights into classroom management issues and can perhaps be used interchangeably. In future research, next to teachers' perceptions, researchers should also pay attention to students' perceptions of teachers' classroom practices.

Although a large number of teachers participated in our survey, our sample of schools was limited ($n = 32$). As a consequence, we had to fit multilevel models to teachers' scores on each of the measurement occasions to examine the development of school-wide capacity and its impact on classroom practices. Future research with a larger number of schools, allowing for multi-level structural equation modeling, could contribute to the testing of more complex models. Moreover, a larger sample including a wide variety of schools provides the opportunity to identify latent "change trajectories" (i.e. stable, improving, declining) of individual schools that describe variation of school-wide capacity for improvement among schools over a period of time. Analyzing "change trajectories" of schools may also help to reveal how differences in building school-wide capacity are related to differences in the performance of schools as measured by student outcomes. Information about student outcomes should also be collected to test how school-wide capacity for improvement can affect growth in student outcomes over time, and whether effects persist over time.

Our research was conducted within the context of elementary education. We expect that building school-wide capacity and the impact on teachers' classroom practices and student outcomes may be different in other, more complex contexts. To test this assumption, comparable studies in other contexts such as schools for secondary education, vocational education and training sector, should be conducted. Validating our findings in various contexts can provide more information about the generalizability of our findings.

The few longitudinal studies on processes of building school improvement capacity available suggest that leadership develops over a period of time (Heck and Hallinger, 2009; Smylie and Wenzel, 2003; Thoonen *et al.*, 2012). Although our results confirm the positive effects of leadership practices on the development of teacher factors over time as identified in recent studies (Day *et al.*, 2011; Louis *et al.*, 2010; Sammons *et al.*, 2011). The findings also show that teachers' motivation and engagement in professional

learning activities hardly or even not increased. And as we mentioned before, the instructional strategies teachers use even decreased. As leadership inspired by the concept of transformational leadership can have an important facilitating role in fostering conditions for school improvement, we focussed on specific set of leadership activities. In order to increase our understanding of the complex paths through which school leaders have an impact on school effectiveness and school improvement, different scholars consider using a more integrated model, in which transformational leadership and instructional leadership coexist, as a further “challenge” to future research on school leadership (Hallinger, 2003; Marks and Printy, 2003; Robinson *et al.*, 2008). We agree with the argument that researchers should focus more on the impact a broader set of leadership activities, including transformational and instructional ones, have on teaching and learning.

In addition, leadership in our study was considered a function of individual knowledge and expertise. More and more scholars use a distributed perspective for thinking about and studying school leadership. From a distributed perspective, leadership practice takes shape in the interaction of school leaders, followers and aspects of their situation, shifting the focus from leaders to leadership practice (Spillane, 2006; Spillane *et al.*, 2004). We need more empirical studies to distributed leadership that interrogate the relationship between distributed leadership and capacity building for school-wide improvement. Distributing leadership does not automatically result in more school improvement capacity; not any form of distributed leadership is inherently good. Much depends on the way in which leadership is distributed, how it is distributed and for what purpose (Harris *et al.*, 2007). Moreover, it depends on the growth state of the organization, its readiness to change, its culture and its developmental needs (Harris, 2008). It is clear that various patterns or configurations of distributed leadership practice can influence organizational change and development (Leithwood *et al.*, 2007). The existing empirical studies we have are still not extensive, fine grained or detailed enough to offer deep insights into the relationship between distributed leadership and school organizational conditions, teacher motivation and teacher learning. We need to know much more about the nature and extent of the influence of distributed leadership on building capacity for improvement and, in the end, on improved classroom practices aimed at increasing student achievement.

A final limitation of our study is that we did not include system-level variables such as the support schools receive from districts, parents and local stakeholders. Research has shown that, in addition to school leaders and teachers, superintendents or school boards can also play an important role in the improvement of schools improving schools. There is some evidence for the assumption that capacity building by superintendents with a focus on results fosters the improvement of student achievement (Leithwood, 2010; Togneri and Anderson, 2003). Among others, evidence was provided for district-wide, job-embedded professional development of school leaders and teachers, the use of evidence for planning, organizational learning and accountability, district-wide focus on student achievement, and approaches to curriculum and instruction. So far, little attention has been devoted to the paths and mechanisms through which capacity building by superintendents can have an impact on student achievement. To identify effective strategies through which superintendents can support capacity building at the school level, future research could test the contribution of school districts that represent schools with a full range of performance (high, medium and low) and school improvement capacity. Findings of these studies

can help us to better understand school improvement as the interaction between the change process and the setting.

Notes

1. Although we acknowledge that there are significant differences between the terms “change,” “improvement” and “implementation,” we agree with Louis *et al.* (1999) that the language of scholars in the domain of school effectiveness and school improvement is imprecise. We will therefore use the terms interchangeably and focus on a deeper understanding how building school-wide capacity for improvement can have an impact on changing teachers’ instructional practices.
2. The reported α coefficients of our scales are calculated for the first wave of data collection (2005).

References

- Bandura, A. (1977), “Self-efficacy: toward a unifying theory of behavioral change”, *Psychological Review*, Vol. 82 No. 2, pp. 191-215.
- Bandura, A. (1986), *Social Foundations of Thought and Action: A Social Cognitive Theory*, Prentice Hall, Englewood Cliffs, NJ.
- Bandura, A. (1997), *Self-Efficacy: The Exercise of Control*, W.H. Freeman and Company, New York, NY.
- Berends, M., Chun, J., Schuyler, G., Stockly, S. and Briggs, R.J. (2002), *Challenges of Conflicting School Reforms: Effects of New American Schools in a High-Poverty District*, Rand, Santa Monica, CA.
- Berman, P. and McLaughlin, M. (1975), *Federal Programs Supporting Educational Change: Vol. 4, The Findings in Review*, Rand, Santa Monica, CA.
- Blok, H., Oostdam, R. and Peetsma, T. (2006), *Het nieuwe leren in het basisonderwijs; een begripsanalyse en een verkenning van de schoolpraktijk [New Learning in Elementary Education; A Conceptual Analysis and An Exploration of School Practice]*, SCO-Kohnstamm Instituut, Universiteit van Amsterdam, Amsterdam.
- Blok, H., Slegers, P. and Karsten, S. (2008), “Looking for a balance between internal and external evaluation of school quality: evaluation of the svi model”, *Journal of Educational Policy*, Vol. 23 No. 4, pp. 379-395.
- Borman, G., Hewes, G., Overman, L.T. and Brown, S. (2003), “Comprehensive school reform and achievement: a meta-analysis”, *Review of Educational Research*, Vol. 73 No. 2, pp. 125-130.
- Borman, G.F., Slavin, R.E., Cheung, A., Chamberlain, A.M., Madden, N.A. and Chambers, B. (2005), “Success for all: first-year results from the national randomized field trial”, *Educational Evaluation and Policy Analysis*, Vol. 27 No. 1, pp. 1-23.
- Borman, K.M., Carter, K., Aladjem, D.K. and LeFloch, K.C. (2004), “Challenges for the future of comprehensive school reform”, in Cross, C.T. (Ed.), *Putting the Pieces Together: Lessons from Comprehensive School Reform Research*, National Clearinghouse for Comprehensive School Reform, Washington, DC, pp. 109-150.
- Bruggencate, G.t., Luyten, H., Scheerens, J. and Slegers, P. (2012), “Modeling the influence of school leaders on student achievement: how can school leaders make a difference?”, *Educational Administration Quarterly*, Vol. 48 No. 8, pp. 699-732.
- Bryk, A., Camburn, E. and Louis, K.S. (1999), “Professional community in Chicago elementary schools: facilitating factors and organizational consequences”, *Educational Administration Quarterly*, Vol. 35 No. 5, pp. 751-781.
- Camburn, E., Rowan, B. and Taylor, J. (2003), “Distributed leadership in schools: the case of elementary schools adopting comprehensive school reform models”, *Educational Evaluation and Policy Analysis*, Vol. 25 No. 4, pp. 347-374.

- Clarke, D. and Hollingsworth, H. (2002), "Elaborating a model of teacher professional growth", *Teaching and Teacher Education*, Vol. 18 No. 8, pp. 947-967.
- Coburn, C.E. (2003), "Rethinking scale: moving beyond numbers to deep and lasting change", *Educational Researcher*, Vol. 32 No. 6, pp. 3-12.
- Creemers, B.P.M. (1994), *The Effective Classroom*, Cassell, London.
- Datnow, A., Hubbard, L. and Mehan, H. (2002), *Extending Educational Reform: From One School to Many*, Routledge Falmer Press, New York, NY.
- Day, C., Sammons, P., Leithwood, K., Hopkins, D., Gu, Q., Brown, E. and Ahtaridou, E. (2011), *School Leadership and Student Outcomes: Building and Sustaining Success*, Open University Press, Maidenhead.
- de Kock, A., Slegers, P. and Voeten, M.J.M. (2004), "New learning and the classification of learning environments in secondary education", *Review of Educational Research*, Vol. 74 No. 2, pp. 141-170.
- Dembo, M.H. and Gibson, S. (1985), "Teachers' sense of efficacy: an important factor in school improvement", *The Elementary School Journal*, Vol. 86 No. 2, pp 175-184.
- Desimone, L. (2002), "How can comprehensive school reform models be successfully implemented?", *Review of Educational Research*, Vol. 72 No. 3, pp. 433-479.
- Evans, R. (1996), *The Human Side of School Change*, Jossey-Bass, San Francisco, CA.
- Firestone, W.A. and Corbett, H.D. (1988), "Planned organizational change", in Boyan, N.J. (Ed.), *Handbook of Research on Educational Administration*, Longman, New York, NY, pp. 321-341.
- Ford, M.E. (1992), *Motivating Humans: Goals, Emotions, and Personal Agency Beliefs*, Sage, Newbury Park, CA.
- Fullan, M. (1991), *The New Meaning of Educational Change*, Teachers College Press, New York, NY.
- Fullan, M. and Hargreaves, A. (1992), *Teacher Development and Educational Change*, Falmer, London.
- Garet, M.S., Porter, A.C., Desimone, L., Birman, B.F. and Yoon, K.S. (2001), "What makes professional development effective? Results from a national sample of teachers", *American Educational Research Journal*, Vol. 38 No. 4, pp. 915-945.
- Geijsel, F., Slegers, P. and van den Berg, R. (1999), "Transformational leadership and the implementation of large-scale innovation programs", *Journal of Educational Administration*, Vol. 37 No. 4, pp. 309-328.
- Geijsel, F., Slegers, P., Leithwood, K. and Jantzi, D. (2003), "Transformational leadership effects on teachers' commitment and effort toward school reform", *Journal of Educational Administration*, Vol. 41 No. 3, pp. 228-256.
- Geijsel, F., Slegers, P., van den Berg, R. and Kelchtermans, G. (2001), "Conditions fostering the implementation of large-scale innovation programs in schools: teachers' perspectives", *Educational Administration Quarterly*, Vol. 37 No. 1, pp. 130-166.
- Geijsel, F.P. (2001), "Schools and innovations. Conditions fostering the implementation of educational innovations", doctoral dissertation, Nijmegen University Press, Nijmegen.
- Geijsel, F.P., Krüger, M.L. and Slegers, P.J.C. (2010), "Data feedback for school improvement: the role of researchers and school leaders", *Australian Educational Researcher*, Vol. 37 No. 2, pp. 59-75.
- Geijsel, F.P., Slegers, P.J.C., Stoel, R.D. and Krüger, M.L. (2009), "The effect of teacher psychological and school organizational and leadership factors on teachers' professional learning in Dutch schools", *The Elementary School Journal*, Vol. 109 No. 4, pp. 406-427.
- Goddard, R., Hoy, W.K. and Hoy, A.W. (2000), "Collective teacher efficacy: its meaning, measure, and impact on student achievement", *American Educational Research Journal*, Vol. 37 No. 2, pp. 479-507.

- Golembiewski, R.T., Billingsley, K. and Yeager, S. (1976), "Measuring change and persistence in human affairs: types of change generated by OD designs", *Journal of Applied Behavioral Science*, Vol. 12 No. 2, pp. 133-157.
- Hall, G.E. and Hord, S.M. (2006), *Implementing Changes: Patterns, Principles and Potholes*, 2nd ed., Pearson/Allyn & Bacon, Boston, MA.
- Hallinger, P. (2003), "Leading educational change: reflections on the practice of instructional and transformational leadership", *Cambridge Journal of Education*, Vol. 33 No. 3, pp. 329-351.
- Hallinger, P. and Heck, R.H. (2011), "Exploring the journey of school improvement: classifying and analyzing patterns of change in school improvement processes and learning outcomes", *School Effectiveness and School Improvement*, Vol. 22 No. 1, pp. 1-27.
- Hallinger, P. and Murphy, J.F. (1986), "The social context of effective schools", *American Journal of Education*, Vol. 94 No. 3, pp. 328-355.
- Harris, A. (2008), "Distributed leadership: according to the evidence", *Journal of Educational Administration*, Vol. 46 No. 2, pp. 182-188.
- Harris, A., Leithwood, K., Day, C., Sammons, P. and Hopkins, D. (2007), "Distributed leadership and organizational change: reviewing the evidence", *Journal of Educational Change*, Vol. 8 No. 4, pp. 337-347.
- Heck, R.H. and Hallinger, P. (2009), "Assessing the contribution of distributed leadership to school improvement and growth in math achievement", *American Educational Research Journal*, Vol. 46 No. 3, pp. 626-658.
- Hopkins, D. (2001), *School Improvement for Real*, Routledge/Falmer, London.
- Jarvis, P. (1987), *Adult Learning in the Social Context*, Croom Helm, London.
- Jongmans, K., Slegers, P., Biemans, H. and de Jong, F. (2004), "Teachers' participation in school policy: Nature, extent and orientation", *Journal of Agricultural Education and Extension*, Vol. 10 No. 1, pp. 1-12.
- Klingner, J.K., Cramer, E. and Harry, B. (2006), "Challenges in the implementation of success for all by four urban schools", *Elementary School Journal*, Vol. 106 No. 4, pp. 333-349.
- Kunter, M. and Baumert, J. (2006), "Who is the expert? Construct and criteria validity of student and teacher ratings of instruction", *Learning Environment Research*, Vol. 9 No. 3, pp. 231-251.
- Kwakman, K. (2003), "Factors affecting teachers' participation in professional learning activities", *Teaching and Teacher Education*, Vol. 19 No. 2, pp. 149-170.
- Leithwood, K. (2010), "Characteristics of school districts that are exceptionally effective in closing the achievement gap", *Leadership and Policy in Schools*, Vol. 9 No. 3, pp. 245-229.
- Leithwood, K. and Jantzi, D. (2005), "A review of transformational leadership research 1996-2005", *Leadership and Policy in Schools*, Vol. 4 No. 3, pp. 177-200.
- Leithwood, K. and Jantzi, D. (2006), "Transformational school leadership for large-scale reform: effects on students, teachers, and their classroom practices", *School Effectiveness and School Improvement*, Vol. 17 No. 2, pp. 201-227.
- Leithwood, K. and Louis, K.S. (1998), *Organizational Learning in Schools*, Swets and Zeitlinger, Lisse.
- Leithwood, K. and Sun, J. (2012), "The nature and effects of transformational leadership: a meta-analytic review of unpublished research", *Educational Administration Quarterly*, Vol. 48 No. 3, pp. 387-423.
- Leithwood, K. and Sun, J.P. (2009), "Transformational school leadership effects on schools, teachers and students", in Hoy, W.K. and DiPaola, M. (Eds), *Studies in School Improvement*, Information Age Publishers, Charlotte, NC, pp. 1-22.

- Leithwood, K., Harris, A. and Hopkins, D. (2008), "Seven strong claims about successful school leadership", *School Leadership & Management*, Vol. 28 No. 1, pp. 27-42.
- Leithwood, K., Harris, A. and Strauss, T. (2010), *Leading School Turnaround*, Jossey-Bass, San Francisco, CA.
- Leithwood, K., Jantzi, D. and Mascal, B. (2002), "A framework for research on large-scale reform", *Journal of Educational Change*, Vol. 3 No. 1, pp. 7-33.
- Leithwood, K., Dart, B., Jantzi, D. and Steinbach, R. (1993), *Building Commitment for Change and Fostering Organizational Learning (Final Report for Phase Four of the Research project: Implementing British Columbia's Education Policy)*, Open University Press, British Columbia Ministry of Education, Victoria, BC.
- Leithwood, K., Louis, K.S., Anderson, S. and Wahlstrom, K.T. (2004), *Review of Research: How Leadership Influences Student Learning*, Wallace Foundation, New York, NY.
- Leithwood, K., Mascal, B., Strauss, T., Sacks, R., Memon, N. and Yashkina, A. (2007), "Distributing leadership to make schools smarter", *Leadership & Policy in Schools*, Vol. 6 No. 1, pp. 37-67.
- Leithwood, K.A., Aitken, R. and Jantzi, D. (2001), *Making Schools Smarter*, Corwin Press, Thousand Oaks, CA.
- Leithwood, K.A., Jantzi, D. and Steinbach, R. (1999), *Changing Leadership for Changing Times*, Open University Press, Buckingham.
- Little, J.W. (1990), "The persistence of privacy: autonomy and initiative in teachers' professional relations", *Teachers College Record*, Vol. 91 No. 4, pp. 509-536.
- Lohman, M.C. and Wolf, N.H. (2001), "Self-initiated learning activities of experienced public school teachers: methods, sources, and relevant organizational influences", *Teachers and Teaching*, Vol. 7 No. 1, pp. 59-74.
- Lomos, C., Hofman, R.H. and Bosker, R.J. (2011), "Professional community and student achievement – a meta-analysis", *School Effectiveness and School Improvement*, Vol. 22 No. 2, pp. 121-148.
- Louis, K.S. and Marks, H.M. (1998), "Does professional community affect the classroom? Teachers' work and student experiences in restructuring schools", *American Journal of Education*, Vol. 106 No. 4, pp. 532-575.
- Louis, K.S., Marks, H.M. and Kruse, S. (1996), "Teachers' professional community in restructuring schools", *American Educational Research Journal*, Vol. 33 No. 4, pp. 757-800.
- Louis, K.S., Toole, J. and Hargreaves, A. (1999), "Rethinking school improvement", in Murphy, J. and Louis, K.S. (Eds), *Handbook of Research on Educational Administration*, 2nd ed., Jossey-Bass, San Francisco, CA, pp. 251-276.
- Louis, K.S., Leithwood, K., Wahlstrom, K.L. and Anderson, S.E. (2010), *Learning From Leadership: Investigating the Links to Improved Student Learning*, The Wallace Foundation, Minnesota, MN/Toronto.
- Marks, H.M. and Printy, S.M. (2003), "Principal leadership and school performance: integrating transformational and instructional leadership", *Educational Administration Quarterly*, Vol. 39 No. 3, pp. 370-397.
- Mayer, A.P., Donaldson, M.L., LeChasseur, K., Welton, A.D. and Cobb, C.D. (2013), "Negotiating site-based management and expanded teacher decision making: a case study of six urban schools", *Educational Administration Quarterly*, Vol. 49 No. 5, pp. 695-713.
- Miles, M.B. (1986), *Research Findings on the Stages of School Improvement*, Mimeo, Center for Policy Research, New York, NY.
- Miller, R.J. and Rowan, B. (2006), "Effects of organic management on student achievement", *American Educational Research Journal*, Vol. 43 No. 2, pp. 219-253.

- Mitchell, C. and Sackney, L. (2000), *Profound Improvement: Building Capacity for a Learning Community*, Swets & Zeitlinger, Lisse.
- Mulford, B. (2005), "Accountability policies and their effects", in Bascia, N., Cumming, A., Datnow, A., Leithwood, K. and Livingston, D. (Eds), *International Handbook of Educational Policy*, Springer, London, pp. 281-294.
- Mulford, B. and Silins, H. (2003), "Leadership for organisational learning and improved student outcomes", *Cambridge Journal of Education*, Vol. 33 No. 2, pp. 175-195.
- Mulford, W.R. and Silins, H. (2009), "Transformational leadership and organisational learning", in Khine, M.S. and Saleh, I.M. (Eds), *Transformative Leadership and Educational Excellence*, Sense Publishers, Rotterdam, the Netherlands, pp. 139-164.
- Nguni, S., Slegers, P. and Denessen, E. (2006), "Transformational and transactional leadership effects on teachers' job satisfaction, organizational commitment, and organizational citizenship behavior in primary schools: the Tanzanian case", *School Effectiveness and School Improvement*, Vol. 17 No. 2, pp. 145-177.
- Nicolaidou, M. and Ainscow, M. (2005), "Understanding failing schools: perspectives from the inside", *School Effectiveness and School Improvement*, Vol. 16 No. 3, pp. 229-248.
- Oort, F.J., Visser, M.R.M. and Sprangers, M.A.G. (2009), "Formal definitions of measurement bias and explanation bias clarify measurement and conceptual perspectives on response shift", *Journal of Clinical Epidemiology*, Vol. 62 No. 11, pp. 1126-1137.
- Oostdam, R., Peetsma, T. and Blok, H. (2007), *Het nieuwe leren in het basisonderwijs en voortgezet onderwijs nader beschouwd: een verkenningsnotitie voor het Ministerie van Onderwijs, Cultuur en Wetenschappen [New Learning in Primary and Secondary Education: An Explorative Study for the Ministry of Education, Culture and Sciences]*, SCO-Kohnstamm Instituut, Amsterdam.
- O'Toole, J. (1995), *Leading Change*, Jossey-Bass, San Francisco, CA.
- Parise, L.M. and Spillane, J.P. (2010), "Teacher learning and instructional change: how formal and on-the-job learning opportunities predict changes in elementary school teachers' instructional practice", *Elementary School Journal*, Vol. 110 No. 3, pp. 323-346.
- Purkey, S.C. and Smith, M.S. (1983), "Effective schools: a review", *The Elementary School Journal*, Vol. 83 No. 4, pp. 426-452.
- Putnam, R.T. and Borko, H. (2000), "What do new views of knowledge and thinking have to say about research on teacher learning", *Educational Researcher*, Vol. 29 No. 1, pp. 4-15.
- Reynolds, D., Teddlie, C., Hopkins, D. and Stringfield, S. (2000), "Linking school effectiveness and school improvement", in Teddlie, C. and Reynolds, D. (Eds), *The International Handbook of School Effectiveness Research*, Falmer Press, London, pp. 206-231.
- Richardson, V. and Placier, P. (2001), "Teacher change", in Richardson, V. (Ed.), *Handbook of Research on Teaching*, American Educational Research Association, Washington, DC, pp. 905-947.
- Robinson, V.M.J., Lloyd, C.A. and Rowe, K.J. (2008), "The impact of leadership on school outcomes: an analysis of the differential effects of leadership types", *Educational Administration Quarterly*, Vol. 44 No. 5, pp. 635-674.
- Rogers, E.M. (2003), *Diffusion of Innovations*, Simon and Schuster, New York, NY.
- Rosenholtz, S.J. (1989), "Workplace conditions that affect teacher quality and commitment: implications for teacher induction programs", *The Elementary School Journal*, Vol. 89 No. 4, pp. 421-439.
- Rosenholtz, S.J. (1991), *Teachers' Workplace. The Social Organization of Schools*, Teachers College Press, New York, NY.
- Rowan, B. (1990), "Commitment and control: alternative strategies for the organizational design of schools", in Cadzen, C. (Ed.), *Review of Research in Education*, Vol. 16, American Educational Research Association, Washington, DC, pp. 353-389.

- Rowan, B. (1996), "Standards as incentives for instructional reform", in Fuhrman, S.H. and O'Day, J. (Eds), *Rewards and Reform: Creating Educational Incentives That Work*, Jossey-Bass, San Francisco, CA, pp. 195-225.
- Rowan, B. and Miller, R.J. (2007), "Organizational strategies for promoting instructional change: implementation dynamics in schools working with comprehensive school reform providers", *American Educational Research Journal*, Vol. 44 No. 2, pp. 252-297.
- Rowan, B., Raudenbush, S.W. and Cheong, Y.F. (1993), "Teaching as a non-routine task: implications for the management of schools", *Educational Administration Quarterly*, Vol. 29 No. 4, pp. 479-500.
- Rowan, B.P., Correnti, R.J., Miller, R.J. and Camburn, E.M. (2009), "School improvement by design: lessons from a study of comprehensive school reform programs", in Sykes, G., Schneider, B.L., Plank, D.N. and Ford, T.G. (Eds), *Handbook of Education Policy Research*, Routledge, New York, NY, pp. 637-651.
- Runhaar, P.R. (2008), "Promoting teachers' professional development", doctoral dissertation, University of Twente, Enschede.
- Sammons, P., Gu, Q., Day, C. and Ko, J. (2011), "Exploring the impact of school leadership on student outcomes: results from a study of academically improved and effective schools in England", *International Journal of Educational Management*, Vol. 25 No. 1, pp. 83-101.
- Sarason, S.B. (1982), *The Culture of the School and the Problem of Change*, Allyn and Bacon, Boston, MA.
- Scheerens, J. (2008), *Een overzichtsstudie naar school- en instructie-effectiviteit [An Overview Study of School Effectiveness and the Effectiveness of Instruction]*, Universiteit Twente, Vakgroep Onderwijsorganisatie en Management, Enschede.
- Scheerens, J. and Bosker, R. (1997), *The Foundations of Educational Effectiveness*, Pergamon, Oxford.
- Sfard, A. (1988), "On two metaphors for learning and the dangers of choosing just one", *Educational Researcher*, Vol. 27 No. 2, pp. 4-13.
- Shuell, T.J. (1996), "The role of educational psychology in the preparation of teachers", *Educational Psychologist*, Vol. 31 No. 1, pp. 5-14.
- Silins, H.C. (1994), "The relationship between transformational and transactional leadership and school improvement outcomes", *School Effectiveness and School Improvement*, Vol. 5 No. 3, pp. 272-298.
- Slavin, R.E. (1998), "Sand, bricks, and seeds: school change strategies and readiness for reform", in Haregreaves, A., Lieberman, A., Fullan, M. and Hopkins, D. (Eds), *International Handbook of Educational Change*, Kluwer Academic Publishers, Dordrecht, pp. 1299-1313.
- Slegers, P. and Leithwood, K. (2010), "School development for teacher learning and change", in Peterson, P., Baker, E. and McGaw, B. (Eds), *International Encyclopedia of Education*, Vol. 7. Elsevier, Oxford, pp. 557-562.
- Slegers, P., Bolhuis, S. and Geijsel, F. (2005), "School improvement within a knowledge economy: fostering professional learning from a multidimensional perspective", in Bascia, N., Cumming, A., Datnow, A., Leithwood, K. and Livingstone, D. (Eds), *International Handbook of Educational Policy*, Kluwer, Dordrecht, pp. 527-543.
- Slegers, P., Geijsel, F. and van den Berg, R. (2002), "Conditions fostering educational change", in Leithwood, K. and Hallinger, P. (Eds), *Second International Handbook of Educational Leadership and Administration*, Kluwer Academic Publishers, Dordrecht, pp. 75-102.
- Slegers, P., Wassink, H., Van Veen, K. and Imants, J. (2009), "School leaders' problem framing: a sense making approach to problem solving processes of beginning school leaders", *Leadership and Policy in Schools*, Vol. 8 No. 2, pp. 152-172.

- Slegers, P., den Brok, P., Verbiest, E., Moolenaar, N. and Daly, A.J. (2013), "Toward conceptual clarity: a multidimensional, multilevel model of professional learning communities in Dutch elementary schools", *Elementary School Journal*, Vol. 114 No. 1, pp. 118-137.
- Smylie, M.A. (1988), "The enhancement function of staff development: organizational and psychological antecedents to individual teacher change", *American Educational Research Journal*, Vol. 25 No. 1, pp. 1-30.
- Smylie, M.A. (1995), "Teacher learning in the workplace: implications for school reform", in Guskey, T.R. and Huberman, M. (Eds), *Professional Development in Education: New Paradigms and Practices*, Teachers College Press, New York, NY, pp. 92-113.
- Smylie, M.A. and Hart, A.W. (1999), "School leadership for teacher learning and change: a human and social capital development perspective", in Murphy, J. and Louis, K.S. (Eds), *Handbook of Research on Educational Administration*, 2nd ed., Jossey-Bass, San Francisco, CA, pp. 421-443.
- Smylie, M.A. and Wenzel, S.A. (2003), "The Chicago Annenberg Challenge: Successes, Failures, and Lessons for the Future", final technical report of the Chicago Annenberg Research Project, Consortium on Chicago School Research, Chicago, IL.
- Smylie, M.A., Lazarus, V. and Brownlee-Conyers, J. (1996), "Instructional outcomes of school-based participative decision making", *Educational Evaluation and Policy Analysis*, Vol. 18 No. 3, pp. 181-198.
- Snijders, T.A.B. and Bosker, R.J. (1999), *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*, Sage, London.
- Spillane, J.P. (2006), *Distributed Leadership*, Jossey-Bass, San Francisco, CA.
- Spillane, J.P., Halverson, R. and Diamond, B. (2004), "Towards a theory of leadership practice: a distributed perspective", *Journal of Curriculum Studies*, Vol. 36 No. 1, pp. 3-34.
- Spillane, J.P., Reiser, B.J. and Reimer, T. (2002), "Policy implementation and cognition: reframing and refocusing implementation research", *Review of Educational Research*, Vol. 72 No. 3, pp. 387-431.
- Sterbinsky, A., Ross, S.M. and Redfield, D. (2006), "Effects of comprehensive school reform on student achievement and school change: a longitudinal multi-site study", *School Effectiveness and School Improvement*, Vol. 17 No. 3, pp. 367-397.
- Stoll, L. (2009), "Capacity building for school improvement or creating capacity for learning? A changing landscape", *Journal of Educational Change*, Vol. 10 Nos 2/3, pp. 115-127.
- Stoll, L., Bolam, R., McMahon, A., Wallace, M. and Thomas, S. (2006), "Professional learning communities: a review of the literature", *Journal of Educational Change*, Vol. 7 No. 4, pp. 221-258.
- Sun, M., Frank, K.A., Penuel, W.R. and Kim, C.H. (2013), "How external institutions penetrate schools through formal and informal leaders", *Educational Administration Quarterly*, Vol. 49 No. 4, pp. 610-644.
- Supovitz, J.A. (2002), "Developing communities of instructional practice", *Teachers College Record*, Vol. 104 No. 8, pp. 1591-1626.
- ten Dam, G. and Blom, S. (2006), "Learning through participation. The potential of school-based teacher education for developing a professional identity", *Teaching and Teacher Education*, Vol. 22 No. 6, pp. 647-660.
- Thoonen, E.E.J., Slegers, P.J.C., Peetsma, T.T.D. and Oort, F.J. (2011a), "Can teachers motivate students to learn?", *Educational Studies*, Vol. 37 No. 3, pp. 345-360.
- Thoonen, E.E.J., Slegers, P.J.C., Oort, F.J. and Peetsma, T.T.D. (2012), "Building school-wide capacity for improvement: the role of leadership, school organizational conditions and teacher factors", *School Effectiveness and School Improvement*, Vol. 23 No. 4, pp. 441-460.
- Thoonen, E.E.J., Slegers, P.J.C., Oort, F.J., Peetsma, T.T.D. and Geijsel, F.P. (2011b), "How to improve teaching practices: the role of teacher motivation, organizational factors, and leadership practices", *Educational Administration Quarterly*, Vol. 47 No. 3, pp. 496-536.

Togneri, W. and Anderson, S.E. (2003), "Beyond islands of excellence: what districts can do to improve instruction and achievement in all schools", available at: www.learningfirst.org/publications/ (accessed October 2011).

Toole, J.C. and Louis, K.S. (2002), "The role of professional learning communities in international education", in Leithwood, K. and Hallinger, P. (Eds), *Second International Handbook of Educational Leadership and Administration*, Kluwer Academic Publishers, Dordrecht, pp. 245-279.

Tschannen-Moran, M. and Woolfolk Hoy, A. (2001), "Teacher efficacy: capturing an elusive construct", *Teaching and Teacher Education*, Vol. 17 No. 7, pp. 783-805.

US Congress (2001), *No Child Left Behind Act of 2001*, US Department of Education, Washington, DC.

US Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service (2010a), *Evaluation of the Comprehensive School Reform Program Implementation and Outcomes, Fifth-Year Report*, US Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service, Washington, DC.

US Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service (2010b), *Achieving Dramatic School Improvement: An Exploratory Study*, US Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service, Washington, DC, available at: www2.ed.gov/rschstat/eval/other/dramatic-school-improvement/exploratory-study.pdf

van Veen, K. and Slegers, P. (2006), "How does it feel? Teachers' emotions in a context of change", *Journal of Curriculum Studies*, Vol. 38 No. 1, pp. 85-111.

van Woerkom, M. (2003), "Critical reflection at work: bridging individual and organisational learning", doctoral dissertation, Twente University Press, Enschede.

Vescio, V., Ross, D. and Adams, A. (2008), "A review of research on the impact of professional learning communities on teaching practice and student learning", *Teaching and Teacher Education*, Vol. 24 No. 1, pp. 80-91.

Weick, K.E. (1976), "Educational organizations as loosely coupled systems", *Administrative Science Quarterly*, Vol. 21 No. 1, pp. 1-19.

Wheatley, K.F. (2002), "The potential benefits of teacher efficacy doubts for educational reform", *Teaching and Teacher Education*, Vol. 18 No. 1, pp. 5-22.

Wolcott, H.F. (1977), *Teachers vs. Technocrats*, Center for Educational Policy and Management, University of Oregon, Eugene, OR.

Appendix

Table AI.
Comparison of sample and population background characteristics

	<i>M</i>	<i>SD</i>	<i>n</i>	<i>t</i>	(<i>df</i>)	<i>p</i>
Number of students	275.2	120.28	32	-0.65	(31)	0.53
Number of teachers	22.73	8.68	32	-0.083	(31)	0.41
Proportion students with low SES	0.19	0.18	32	0.80	(31)	0.43

Note: Results of the one-sample *t*-tests

Table AII.
Frequency of teachers 'participation in survey

Frequency of participation in survey	Number of teachers
1 time	339
2 times	151
3 times	234
4 times	143

Variables	M1	M2	M3	M4	Changing classroom practices
<i>Transformational leadership</i>					
Vision building	2.67 (0.70)	2.82 (0.68)	2.95 (0.62)	3.04 (0.62)	
Individualized consideration	2.56 (0.77)	2.84 (0.77)	2.89 (0.76)	2.99 (0.73)	
Intellectual stimulation	2.30 (0.64)	2.57 (0.63)	2.75 (0.61)	2.80 (0.60)	
<i>School organization</i>					
Teacher collaboration	2.89 (0.58)	2.95 (0.51)	2.94 (0.53)	3.00 (0.50)	
Participative decision making	3.10 (0.53)	3.05 (0.58)	3.13 (0.52)	3.24 (0.54)	
<i>Teacher motivation</i>					
Teachers' sense of self-efficacy	2.88 (0.47)	2.95 (0.48)	3.00 (0.45)	3.04 (0.47)	
Personal goals	3.22 (0.52)	3.14 (0.50)	3.25 (0.53)	3.31 (0.47)	
<i>Professional learning activities</i>					
Keeping up to date	2.52 (0.53)	2.59 (0.57)	2.59 (0.56)	2.64 (0.58)	
Experimenting and reflection	2.71 (0.47)	2.77 (0.46)	2.83 (0.46)	2.87 (0.46)	
<i>Teachers' classroom practices</i>					
Relatedness to students' world	3.38 (0.54)	3.07 (0.52)	3.09 (0.53)	3.19 (0.46)	
Cooperative learning	3.11 (0.54)	2.93 (0.51)	2.95 (0.54)	2.97 (0.50)	
<i>n</i>	283	673	479	480	

649

Table AIII.
Means and standard deviations over the four measurement points of data collection

Scales and related items

Transformational leadership

Initiating and identifying a vision

The school leader of our school...

1. Makes use of all possible opportunities to communicate the school's vision to the team, the pupils, parents and others
2. Refers explicitly to the school's objectives during the decision-making process
3. Explains to the team the relationship between the school's vision and initiatives taken by the school board, consortiums of schools or the national government
4. Clearly defines current problems from the perspective of a vision of the future of the school
5. Outlines during meetings how the vision of the future of the school affects school life at the present time

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree.
Cronbach's $\alpha = 0.88$

Individualized consideration and support

The school leader of our school...

1. Takes the beliefs of individual teachers seriously
2. Shows appreciation when a teacher takes the initiative to improve teaching in the school or to engage in other forms of professional development
3. Helps teachers to put their emotions into words
4. Looks out for the problems teachers experience during the implementation of reforms

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree.
Cronbach's $\alpha = 0.91$

Providing for intellectual stimulation

The school leader of our school...

1. Helps teachers to express and explain their personal views on education
2. Encourages teachers to try new things in line with their own interests
3. Helps teachers to reflect on new experiences that they have gained on the job

4. Encourages teachers to always think about how to improve our school
5. Encourages teachers to seek and discuss new information and ideas that are relevant to the direction in which the school is developing
6. Engages individual teachers in ongoing discussion about their personal professional goals
7. Encourages teachers to experiment with new teaching methods
8. Creates sufficient opportunities for teachers to work on their professional development

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree.
Cronbach's $\alpha = 0.92$

School organizational conditions

Participative decision-making

1. Teachers can influence the plans being made at our schools for the implementations of innovations
2. During the implementation of innovations, the plan of attack may be adjusted when needed
3. Teachers at our school are involved in decisions about using new teaching methods
4. Teachers at our school take decisions about coordinating the curriculum over the different school years together
5. At our school, we take decisions about new educational objectives for the school together
6. At our school, teachers have a say in the purchase of new teaching materials and resources
7. At our school, changes to classroom teaching are a matter for shared decision-making
8. At our schools, there is space for teachers to adjust joint decisions to their own classroom practices

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree.
Cronbach's $\alpha = 0.89$

Collaboration among teachers

1. My colleagues discuss new teaching methods with me
2. My colleagues give me positive feedback about my teaching
3. The conversations I have with colleagues about my work are superficial
4. My colleagues give me support when I try out new teaching methods
5. My colleagues tell me what problems they have come across and how they solve them
6. My colleagues are only interested in their own lessons
7. My colleagues pass on to me things they have learned from further training

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree.
Cronbach's $\alpha = 0.82$

Teacher motivation

Internalization of school goals into personal goals

1. My personal goals are in line with school's vision
2. I make an effort to put the school's vision of education into practice
3. I know exactly what is meant with the vision of our school
4. I do my best to understand what implications the school's vision has for the way I teach
5. I know what the next steps are that I should take in order to be able to put the school's vision into practice

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree.
Cronbach's $\alpha = 0.82$

Teachers' sense of self-efficacy

1. I feel that I am becoming a better professional
2. I feel that I am able to work effectively

3. I am satisfied with the quality of my work
4. I feel that I am being successful in my work
5. I have sufficient self-confidence to defend my own points of view about the work

Scaling = (1) does apply to me (almost) never, (2) does apply to me sometimes, (3) does apply to me often, (4) does apply to me (almost) always.

Cronbach's $\alpha = 0.81$

Professional learning activities

Keeping up-to-date

1. I keep myself informed on developments within the field
2. I take part in further training and in-service training even if it is not compulsory
3. I read professional literature
4. I collect additional information about educational reforms
5. I keep myself informed on new didactic material

Scaling = (1) does apply to me (almost) never, (2) does apply to me sometimes, (3) does apply to me often, (4) does apply to me (almost) always.

Cronbach's $\alpha = 0.79$

Experimenting and reflection

1. I make my own teaching materials
2. I use students' reactions to improve my classroom teaching
3. I discuss problems in my classroom teaching with others in order to learn from them
4. I try out new knowledge and skills in my lessons
5. In order to get feedback on my teaching, I ask colleagues to attend my lessons
6. I try out new didactic methods in my lessons
7. I share new ideas that I gain in my classroom practice with my colleagues

Scaling = (1) does apply to me (almost) never, (2) does apply to me sometimes, (3) does apply to me often, (4) does apply to me (almost) always.

Cronbach's $\alpha = 0.79$

Teachers' instructional practices

Relatedness to students' personal world

1. I adapt the content of my lessons as much as possible to the students' perceptions of their environment
2. I try to choose topics that relate to the students' interests
3. I choose examples that appeal to students

Scaling = (1) does apply to me (almost) never, (2) does apply to me sometimes, (3) does apply to me often, (4) does apply to me (almost) always.

Cronbach's $\alpha = 0.73$

Cooperation and interaction

1. In the event of group assignments, I assign students to come up with a joint result
2. I pay a lot of attention to developing adequate group assignments
3. In my class, students present the results of assignments to fellow students
4. In the event of group work, I discuss the way in which students cooperated in their groups at the end of class

Scaling = (1) does apply to me (almost) never, (2) does apply to me sometimes, (3) does apply to me often, (4) does apply to me (almost) always.

Cronbach's $\alpha = 0.76$

About the authors

Peter J.C. Sleegers is a Professor of Educational Sciences at the University of Twente. He has published extensively on leadership, innovation and educational policy. His current research projects are studies into the effects of educational leadership on student motivation for school, longitudinal research into sustainability of reforms and design studies into professional learning communities. Professor Peter J.C. Sleegers is the corresponding author and can be contacted at: p.j.c.sleegers@utwente.nl

Dr Erik E.J. Thoonen was a PhD Student at the Institute of Child Development and Education of the University of Amsterdam. After his PhD, he started to work at the Dutch Inspectorate of Education. His research interests include conditions for effective school improvement, building capacity to change, the sustainability of innovations and its effects on student motivation for school.

Dr Frans J. Oort is a Professor of Methods and Statistics at the Institute of Child Development and Education of the University of Amsterdam. His research focusses on structural equation modeling (SEM) with latent variables, non-standard applications of SEM and the use of SEM to detect bias in the measurement of psychological attributes.

Dr Thea T.D. Peetsma is an Associate Professor of Education at the Institute of Child Development and Education of the University of Amsterdam and Programme Director, PhD training of the Graduate School of Educational and Pedagogical Sciences of this university. She specializes in psychosocial development and learning motivation of children, as well as children with special educational needs.

This article has been cited by:

1. Arnoud Oude Groote Beverborg, Peter JC Slegers, Klaas van Veen. 2015. Promoting VET teachers' individual and social learning activities: the empowering and purposeful role of transformational leadership, interdependence, and self-efficacy. *Empirical Research in Vocational Education and Training* 7. . [[CrossRef](#)]