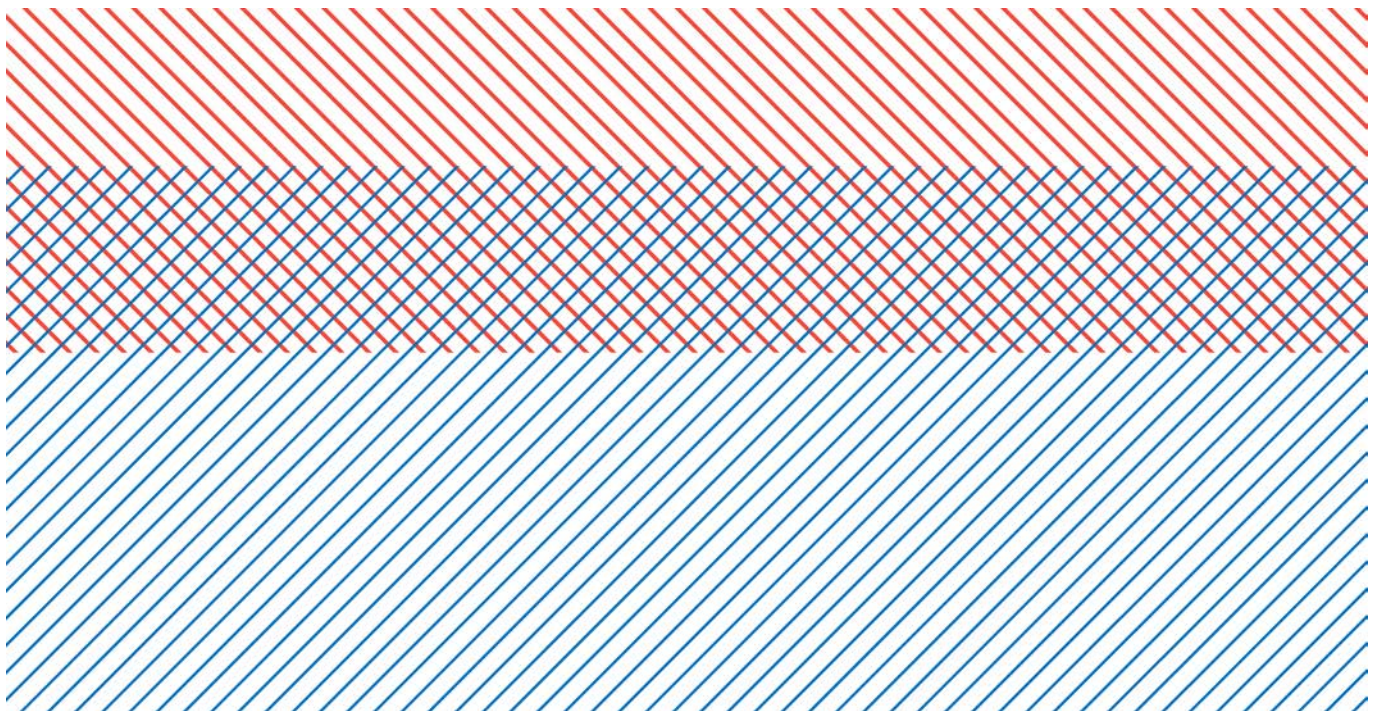


Working paper

# Does School Management Make a Difference?

Effects of Management on the Implementation of the Danish Public School Reform. A Summary



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*Does School Management Make a Difference? – Effects of  
Management on the Implementation of the Danish Public School  
Reform. A Summary*

This working paper is a revised summary of the Danish research report  
*Gør skoleledelse en forskel? Effekter af ledelse på implementering af  
folkeskolereformen* (Søren C. Winter, ed.). Copenhagen: SFI, 2017.

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# Abstract

While implementation research has studied the behaviors of street-level bureaucrats (SLBs) extensively, we have very little knowledge about the role of managers in affecting SLB behaviors during implementation of policy reforms. This report examines the role of managers in the implementation of a major – but contested – public school reform in Denmark. Testing change management theory, we find substantial effects of managerial communication about the change on the implementation of the reform in teaching practices – this concerns both communication of visions and plans for implementation and conversations with employees individually about their future role. However, several other change management aspects have no effect or very slight effects on implementation. We also find substantial implementation effects of managers' professional leadership when they are involved in teaching, i.e. when they observe classroom teaching, provide feedback and discuss methods. The study finds even stronger implementation effects of distributed leadership/professional learning communities of teachers. Finally, manager qualifications matter – not formal but informal qualifications, as perceived by teachers. The management practices that are close to teachers seem to have the strongest impact on their implementation practices. Whereas the study finds strong and robust impacts of some management practices on implementation of the reform, it does not find any certain effects on school performance in terms of pupil learning and well-being. It might be too early to identify such impacts. The study uses school fixed-effect analyses based on annual panel surveys of school managers and teachers in a sample of schools, combined with administrative registry data from 2014 to 2016.

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# 1 Background and purpose

In June 2013, a broad majority in the Danish Parliament, the Folketing, agreed on a reform aimed at achieving academic improvements in the Danish municipal primary and lower secondary public schools (public schools) and improving pupils' well-being. The parties that supported the reform were the Social Democrats, the Social Liberals, the Socialist People's Party, the Liberal Party, the Danish People's Party and the Conservative People's Party. The reform agreement meant that, from the beginning of the school year 2014/15, a new school day would be introduced for all pupils in public schools. As part of this agreement, the Ministry of Education initiated a comprehensive evaluation and follow-up research program to monitor school reform implementation and evaluate the impact of the various aspects of the reform.<sup>1</sup>

As part of the evaluation and follow-up program, VIVE – the Danish National Center of Social Science Research (formerly SFI – The Danish National Centre for Social Research) will be examining the impact of the reform on the administrative and pedagogical management of public schools, and the significance of different types of management for the implementation of the reform and for pupils' learning and well-being. The goal is to follow up on the implementation of the school reform at the management level and possibly provide a background for adjusting as needed.

This working paper is a revised summary of the Danish research report *Gør skoleledelse en forskel? Effekter af ledelse på implementering af folkeskolereformen* (Søren C. Winter, ed.). Copenhagen: SFI, 2017. The revised summary of the underlying report examines the importance of school management for the implementation of the public school reform for school teaching and for pupils' learning and well-being. Furthermore, the report and summary aim at shedding light on possible challenges in the implementation of the school reform at the individual schools.

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<sup>1</sup> The overall evaluation and follow-up research program will be organized by the Danish Ministry of Education in cooperation with EVA – The Danish Evaluation Institute, The Danish School of Education and TrygFonden's Centre for Child Research, both at Aarhus University, VIA University College, SFI – The Danish National Centre for Social Research and KORA – the National Institute for Local and Regional Government Research. In July 2017, SFI and KORA were merged into VIVE – The Danish Center of Social Science Research.

## 2 Expectations in relation to the implementation of the reform

Implementation of major reforms – including school political reforms – typically takes several years. A recent international research review by Åsén (2013 – see also Kirst & Young, 1982) concludes that it usually takes 5 to 15 years before major school policy reforms are implemented and the effects can be measured among pupils. The parties behind the public school reform have also predicted that it will take some years for the public school reform to be implemented.

Implementation research also shows that there are often significant barriers in relation to implementation in the final phase of the implementation process, where the front-end staff are to "deliver" the policies to citizens. Habits and attitudes play a major role in front-end staff conduct. A sense of a significant lack of resources often biases the implementation (Lipsky, 1980, Winter & Nielsen, 2008; Winter, 2012).

Viewed in this light, the public school reform is already likely to be very difficult to implement. Firstly, the reform is highly extensive and complex, and it involves major changes in practice, both for municipalities, school management, and teachers. Secondly, the public school reform is being implemented simultaneously with an inclusion reform seeking to integrate pupils with special needs in ordinary classroom teaching, which is also highly comprehensive. Thirdly, the reform was initially met with great resistance from many teachers and their organizations due, among other things, to the simultaneous lockout of teachers as well as regulatory amendments to Act no. 409 that revoked their working hours' agreement and imposed more teaching hours on them.

Fourth, by international standards there seems to be a tradition of Danish school principal having less decision authority than their counterparts in many other countries, implying more teacher autonomy (Meier et al., 2015). On this basis, we could hardly expect that managers would be able to provide a particularly high degree of implementation of the reform in schools, just two years after the reform coming into force. This makes the implementation of the Danish Public School Reform a critical case (Yin, 1994). The finding that some management practices nevertheless have a strong impact on implementation of the Danish reform would seem to indicate that similar management effects are likely to be found in other settings.

The school reform defines a number of requirements and expectations as to how school education must be changed to meet the key intention of increasing learning and well-being among pupils. In this report, we have translated these requirements and expectations into six teaching practices, which will be measured by indices of a number of indicators:

- Variation in curricula (incl. physical education and exercise, and an "open school" involving local business and other actors in teaching)
- Use of IT in teaching
- Education based on the national "Common Goals"
- Learning goal-based education
- Use of differentiated teaching
- Focus on order in the classroom.

If we look at the average trend in these indicators from before the reform in 2014 to 2016, implementation of these reform elements appears to vary somewhat. We find a statistically significant increase in the use of IT in teaching and in teaching based on the national "Common Goals", while

there is a decline in terms of variation in curricula and in differentiated teaching. When it comes to the implementation of learning goal-based education and order in the classroom, there seems to be no progress during the period. Overall, some elements are implemented to a higher degree than before the reform, whereas others are implemented to a lesser degree – and for some elements implementation has not changed significantly.

This analysis is supported by recent quantitative and qualitative surveys of the reform by SFI and KORA, among others. They show that, in the spring of 2016, no significant implementation of the school reform has taken place in school teaching, apart from more physical education and exercise (i.e. elements of variation in curricula). The surveys show that implementation does not happen all at once, but as continuous processes with gradual adjustments: Schools test, evaluate, adjust, test, and so on (Jacobsen et al., 2016; Bjørnholt et al., 2015; Kjer & Rosdahl, 2016).

The implementation of the reform is also a legal requirement, however. In the spring of 2016, more progress had been made in terms of implementation at management level than at teacher level. SFI's survey showed that different aspects of school management had, on average, changed to varying degrees in the direction of the school reform intentions (Kjer & Winter, 2016). However, the initial implementation at management level has not been sufficient to increase the degree of implementation of most teaching elements among teachers and educators. This holds true when you look at the average implementation degree nationwide. In short: Implementation is a challenge!

However, there are *variations* in both school management and in the implementation of the reform in the area of teaching. In this report, we will examine what the differences in school management mean to the degree of reform implementation in the teaching in schools. In this manner, we wish to show how the management at individual schools can be designed and modified to strengthen the implementation of the reform.

### 3 The Danish context

In Denmark, 10 years of basic education are mandatory (i.e. grades 0 through 9). Children start grade 0 in the year they turn 6 years of age. The final three grades (7-9) are the equivalent of a US middle school (i.e. lower secondary school). About 83 percent of pupils are enrolled in public schools, which are free of charge and are administered by municipalities. The remaining pupils are enrolled in private, non-profit schools.



## 4 Methods

It is not that straightforward to measure the effects of a major reform on something as complex as school management and pupils' learning and well-being. Our effect study is based on surveys of a representative panel of school principals and teachers from 140-190 schools (on management and teaching), and pupils (on their well-being). We have data from 2014, 2015, and 2016. In our analysis of the effects of school management on pupil learning, we also use nationwide school principal surveys from 2011, 2013, 2015, and 2016. In addition, we use administrative registry data, including national test data, to assess pupils' learning and control for social family background.

We use *school-fixed-effects analysis* by means of panel (longitudinal) data to examine the effects of school management. The method is recognized internationally as a relatively strong method. It involves an examination of whether changes in management over time are accompanied by changes in the implementation of the school reform in different teaching practices and in pupils' learning and well-being in each individual school.

We measure the effect of a given kind of management in terms of the maximum implementation potential percentage that can be achieved in a given teaching practice, if management is changed from 0 to the maximum on the management scale used. Therefore, when we refer to effects in percentages, this is the potential maximum effect, i.e. a case where a school principal goes from not using the management practice to using it to the maximum degree. In many cases, however, principals will already be using the various practices, to a greater or lesser extent. For smaller changes in management, the effect is also reduced.<sup>2</sup>

Besides the quantitative effect study, we also include qualitative interviews with teachers and principals in six selected schools and a number of documents from schools, unions, and municipalities.

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<sup>2</sup> For example, if the maximum potential effect of a given type of school management is 30 percent, an increase of this kind of school management of 10 percent will lead to an increase in reform implementation of 10 percent (of 30 percent), i.e. 3 percent.

## 5 Findings for pupils' learning and well-being

Ultimately, effective school management should not only enhance teachers' implementation of the school reform, but it should also improve pupils' learning and well-being through the management's influence on teaching at the school. In this study, however, we have not been able to identify any plausible and robust, statistically significant effects of school management on pupil learning and well-being. In addition to measuring simultaneous effects, we have also examined the delayed effects, where pupil learning and well-being in one year is compared with developments in school management in the previous year, but we have not been able to find any effects here either. Nor has it been possible to identify any effects of school management on learning and well-being among pupils with weak social backgrounds, even though increased learning among disadvantaged pupils is a specific target of the school reform.

We cannot know for sure why we have not been able to find any effects of school management on pupil learning or well-being. As suggested earlier, it is possible that it takes longer for the reform to be implemented sufficiently in the area of teaching for pupil learning and well-being to change so much that it can be detected in national test scores and satisfaction surveys.

The long delay in the effects of the school reform may seem contrary to the results of evaluations of very limited interventions and experiments. In those cases, effects are often measured after less than a year (Åsén, 2013). The school reform, however, is no single, specific intervention, but a large collection of numerous interventions carried out in a short space of time and simultaneously with a comprehensive inclusion reform. So, that we do not find any effects on learning and well-being may also be due to it being difficult to separate the effects of the individual reform initiatives.

The lack of results regarding pupils' learning and well-being may also be due to us not being able to measure the school reform's teaching elements or the development in pupils' learning and well-being accurately enough.

Finally, it cannot be entirely ruled out that the teaching elements of the reform have not had the effect on pupils' learning and well-being that the reform intended – though at least some of the reform's educational elements are supported by international and Danish school research (Hattie, 2008; Winter & Nielsen, 2013).

Since we cannot find any definite effects of school management on pupils' learning and well-being, this report focuses mainly on the effects of school management on the implementation of the school reform into teachers' teaching practices.

## 6 Effects of school management on the implementation of the public school reform

The school reform gives school principals an important role in the implementation of the reform's intentions in school teaching, and in relation to pupils' learning and well-being. School management is a complex area but, in this report, we have chosen to describe the five items that reflect the main political reform intentions with regard to management. The *five management items* are:

- Change management
- Skills development
- Pedagogical leadership
- External management
- Performance management and autonomy.

This report is structured around these five items. Each of these items includes several more specific management issues, which are measured by indices of indicators. Below, we present the most important effects of school management on the implementation of the reform into teachers' teaching. As mentioned earlier, we have divided the reform into *six teaching practices*:

- Variation in curricula (incl. physical education and exercise and the "open school")
- Use of IT in teaching
- Education based on the national "Common Goals"
- Learning goal-based education
- Use of differentiated teaching
- Focus on order in the classroom.

As mentioned above, the effects of school management on each management item will be measured on the maximum implementation potential in percentages that can be achieved in a given teaching practice, if management is changed from 0 to the maximum score.

### 6.1 Change management

School principals are responsible for implementing the school reform at their school. According to the reform, this can be done by using pedagogical leadership through skills development, performance management, and leadership involvement in pedagogics, as well as through external cooperation and dialogue with the municipality and the local community, which we will discuss below. However, management of the reform implementation can also be regarded as management of a huge organizational change, which can usefully be examined using general theories of change management and the effects thereof.

For decades, principles of change management have been widespread internationally among researchers (e.g., Kotter, 1996; Fernandez & Rainey, 2006), consultants, and practitioners. The theories have been highly normative but, as far as we know, they have not been tested in a systematic, empirical, quantitative study until this report. Change management implies that the school management forms and applies goal-oriented strategies to tackle the enormous transformation that a reform like the public school reform requires.

Our analyses find statistically significant effects of a series of change management factors. These effects are relatively robust across the six teaching practices. However, the individual change management factors seem to have effects of quite different magnitudes. By far the most important of them seems to be the management's *communication strategy*. Such a strategy must be communicated clearly to employees and should include:

- A brief and clear vision for the school's future development under the public school reform (*where do we want to go!*)
- A plan for implementation of the reform elements in the school (*how do we get there?*)
- Interviews with individual employees about their future role after implementation of the reform to reduce uncertainty and provide reassurance (*What is in it for me?*).

We find that such a communication strategy can have a significant effect. For five out of the six teaching practices, we find a potential for increasing the implementation of the reform of up to between 7 and 23 percent.

If change processes are to succeed, literature on change management also emphasizes the importance of building a supporting coalition - including key employees who are for instance involved in a committee planning the implementation process. This is supported by our study, but the effect seems to be quite modest. There is only a potential for increasing implementation in the teachers' teaching practices of up to 1 - 2 percent. However, as we shall see later, there are much more effective ways of involving teachers in the implementation process

Attitudes of employees are also considered essential in both change management and implementation research. In change management literature, great emphasis is placed on employees experiencing "a burning platform", as changes in existing workflows and organizations are considered to be necessary. However, we have found no effect of it in this study. Especially implementation research stresses that employees' commitment to a reform affects its implementation. This is supported by our study. As expected, we find that when teachers believe the public school reform will lead to a better school they also implement the reform in their teaching to a greater extent. The effect is surprisingly low, though, with a potential for increased reform implementation in their teaching of only up to 1-2 percent. However, teachers' support of specific elements of the reform might have a stronger effect, which will be examined in the future.

In many schools, the public school reform is still far from being fully implemented in teaching. However, our analyses show that change management is not merely a tool that is relevant when the reforms come into force. In several cases, change management has also had clear effects during the reform's second year. Sometimes, the effects of changes in change management elements even increase over time. This may seem surprising, but could be due to some teachers initially being so frustrated with the reform and with Act no. 409, which annulled the teachers' agreement regarding working hours, that some types of change management elements had less impact initially than later on.

Our qualitative study gives an indication of how change management can build commitment among employees and greater support of the reform. The study indicates that school management has a certain amount of influence on the pedagogical staff's ideas and beliefs. Managers can build support with clear and visionary communication. Implementation of the public school reform is a complex task that contains many elements that are impossible to achieve in one go. Clear communication from management not only reduces the complexity of the reform. Management is also involved in setting the direction, overcoming doubt, building visions for the school, and ensuring order and clarity through planning.

Both our qualitative and our quantitative studies show that inclusion and involvement of staff increase implementation. By ensuring employee involvement, management creates collective ownership of the reform, which provides a good foundation for discussing the challenges and problems that the school faces in the comprehensive change process required by the public school reform.

## 6.2 Skills development

Competencies and skills development can be considered as components of change management, but here they are treated separately. They are also important components of the public school reform. We find that school management skills have a significant impact on implementation, when we measure these competencies through teachers' assessments of changes in a variety of skills in their management. Therefore, the teachers have been asked to assess the extent to which their school management is competent, has good knowledge of pedagogical methods, and is good at motivating employees and teachers to make a greater effort. The effects are statistically significant and robust across the six different teaching practices. The potential for increasing reform implementation by enhancing management skills is up to 10-11 percent for most teaching practices. This means that the better teachers assess their management to be, the better the implementation will be.

The question is: How do we improve management skills if they are not good enough? Extensive investments have been made in high-level management programs for principals, in recent years. Since 2011, the proportion of principals who participated in a diploma management program has increased from 67 to 81 percent. Over the same period, the percentage of principals who have completed a master's degree in management or leadership has almost doubled from 10 to 19 percent. However, we find no effect of managers' participation in either of the two high-level management training programs on the implementation of the public school reform in teachers' teaching practices. These results are an extension of earlier Danish research showing that formal management training has no impact on pupils' learning (Meier, Pedersen & Hvidman, 2011).

Furthermore, we have found only a very weak impact on implementation of the school principal participating in special courses on the public school reform. We have not found any effects of increased management skills on reform implementation either, when we measure them based on managers' own estimates of how well equipped they are for the tasks arising from the public school reform.

The reform also assigns considerable responsibility for skills development among their teachers to school principals. In the reform, skills development among teachers is considered important for pupils' learning and well-being through teachers' teaching practices. We cannot measure teachers' skills directly, but we can see that there are some differences in the assessments of teachers' skills in schools – both among the teachers themselves and among school principals. However, surprisingly these differences have no effect on teachers' implementation of the reform in their teaching.

Therefore, management competencies are vitally important for the implementation of the school reform, but there are indications that the current skills development does not provide school principals with the required tools.

### 6.3 Professional, pedagogical leadership

It is a key intention of the public school reform to strengthen pedagogical leadership. The concept of "pedagogical leadership" is often seen as a relatively broad concept that includes the principal's and the management team's involvement in the planning of curricula and the choice of teaching methods, distributed pedagogical leadership, management of the school's skills development, and performance management. To get a more detailed picture, this report treats the items "skills development" and "goal and performance management" separately. Thus, when we are treating pedagogical leadership as an item, this specifically concerns leadership involvement in teachers' teaching methods, and distributed pedagogical leadership (i.e. management is delegated to several parties, e.g., middle managers, team leaders, or teachers).

In this study, we measure management's involvement in planning of curricula by looking at whether management is working with:

- Observation of teachers' teaching in the classroom
- Feedback to teachers about their pedagogy
- A discussion of pedagogical issues with teachers, individually or in groups.

We find that these elements provide large and statistically significant effects on reform implementation in teaching across most of the six teaching practices. Thus, there is a potential for increasing the implementation of most of the elements of teaching by up to 18-33 percent. This means that the more the leaders get involved in the pedagogical organization of classes, the better the reform will be implemented.

This provides a significant implementation potential. It turns out that, today, most school management teams are only involved to a very small extent in the planning of teaching and the selection of teaching methods. When we ask school principals, they say that they participate a little more in these pedagogical leadership activities in 2016 than before the public school reform in 2011. However, since many schools have also become larger there is actually less pedagogical leadership per teacher than previously. When we ask the teachers, only about 2 percent remember ever having experienced the above three types of pedagogical leadership during the past school year. On an international scale, Denmark also scores very low in terms of such pedagogical leadership activities (TALIS, 2013).

If management involvement in pedagogical leadership is so effective in increasing implementation, why, then, are school principals not using it more? According to our qualitative study, school principals are wary of exerting too much pressure on the teachers in relation to the implementation of the school reform. We can see that school principals are more persistent with some of the reform elements and less so with others. Thus, in the reform's first year several principals placed more emphasis on the implementation of a longer school day, physical education and exercise, practice-oriented teaching and tutoring, and academic immersion than on, for instance, the open school and the use of IT in teaching. Several school principals are also talking about "protecting" the teaching staff from "further" frustration. Therefore, even though the principals are, to an increasing extent, observing lessons, giving feedback, etc., the interviewed principals are very careful not to force through too many specific requirements.

Our qualitative study also suggests another possible explanation, namely that managers' involvement in the pedagogical work in the first phases of the reform has been aimed extensively at the previous after school center teachers rather than at schoolteachers. In several respects, the former

are facing completely new teaching challenges after becoming involved in classroom teaching due to the reform.

Finally, there is strong evidence that, for instance, managers' observation in classrooms is not a practice that is carried out systematically. Often, observations occur more as an exception than as a rule. They can also sometimes be used as a kind of "quick fix" in relation to teachers with problems in their teaching.

Whatever the reason is for school principals not getting more actively involved in the pedagogical planning of teaching activities, our study indicates that there could be quite extensive implementation benefits to be gained, if managers became more involved in pedagogical work.

Another element in pedagogical leadership is distributed leadership where management tasks are delegated to several parties, e.g., middle managers, team leaders, or teachers. One type of distributed leadership is professional learning communities. Here, teachers learn from each other by observing and assessing each other's teaching in groups. They discuss pedagogical methods and pupils' test results, for instance, and they seek to improve methods and develop new ones.

We have found substantial, statistically significant, and robust effects of professional learning communities for all six teaching practices. Thus, for four of the teaching practices, the potential to increase the implementation in teaching is up to 21-32 percent. The effect is also considerable for the last two practices, with a potential of up to 13 percent for use of differentiated teaching and 6 percent for order in the classroom.

These results are in line with a dozen international studies of professional learning communities and a few Danish studies on partial aspects thereof. These studies find that learning communities strengthen learning among students (Vescio, Ross & Adams, 2008; Laursen & Pedersen, 2011; Lynggaard & Pedersen, 2013).

However, it is also worth noting that when teachers work together in communities they are implementing the school reform's elements in their teaching to a greater extent than when they work alone. Theories of professional learning communities require that the participating teachers have a certain autonomy, in relation to management, that allows them to find, by themselves, more effective ways of teaching than the existing ones. Given the somewhat negative attitudes towards the public school reform expressed by many teachers, you could not beforehand be sure that they would choose methods that are so much in tune with the public school reform as is actually the case. In communities, though, teachers seem to work more loyally in relation to the reform than they do individually.

These positive effects from pedagogical learning communities seem to strengthen the implementation effects we saw with increased employee involvement in the implementation as part of change management greatly. Increased teacher involvement in the planning of teaching and learning methods probably provides increased ownership of the reform. Moreover, teacher involvement could mean that the implementation of the reform can be better adapted to the context in which teachers work.

## 6.4 External management

School management does not only take place within the school but also in interaction with the environment. The public school reform places special emphasis on a fruitful dialogue between the municipality and the school on the implementation of the reform and on quality development. The reform

also focuses on cooperation in relation to the "open school", where the school must work with and involve the local business community as well as local cultural and sports associations and institutions in the school's teaching.

We have found some effects from external management on reform implementation in the classroom, but the effects seem somewhat uncertain. One reason is that we do not find any significant immediate effects, but only so-called "delayed" effects in the form of changes in teaching a year after the changes in the external cooperation took place. However, it makes perfect sense that it may take some time before the school's changed collaborative relationships at senior level lead to changes in teaching among the teachers. The effects found are not very robust across teaching practices.

When we interview school principals, they stress a number of opportunities in making the school more open to the local community. For example, several principals mention that it can contribute to more differentiated teaching, which in turn can help to strengthen pupils' individual learning needs. They also point out, though, that it takes time to make the necessary changes in terms of learning and organization, so that teaching in the open school becomes learning goal-driven, differentiated, and varied. This is mainly because it is a challenge to get volunteers who work during school hours into the school teaching during the daytime.

Several school principals also state that while, in the reform's start-up phase, they did not prioritize working with the open school sufficiently compared to other reform elements, they are now beginning to give higher priority to this work.

## 6.5 Performance management and autonomy

The school reform attaches great importance to performance management on the one hand and increased school principal autonomy on the other. The aim is that all levels between the state, municipalities, schools, and internally in these, should be better managed towards learning goals, especially in relation to pupils' learning and well-being. In addition, the results must be evaluated and followed up on. However, the control of means in terms of procedures and resources should become less rigid so that, for example, school principals have greater autonomy to choose, for their own school, the means that have turned out to be most effective for achieving their goals. In practice, however, the municipalities' control of both goals and means has increased since the reform was introduced. According to our interviews with school principals, they are spending far more time than before on meetings with the municipality regarding requirements and management. However, there are large local variations in the degree of control.

We have found, though, that these differences in the degree of municipal control mean surprisingly little for the implementation of the public school reform into teaching in schools at this point, almost two years after the start of the reform. There are only few and sporadic effects of the level of municipal performance management with regard to learning and well-being goals. This also applies to the effects of municipal control of means in terms of the schools' curricula and staff issues. In addition, there seems to be no effect of schools' internal performance management on implementation.

Thus, on the face of things it seems that both the municipal performance management and the schools' internal performance management have a relatively small impact on the teachers' teaching practices.



## 7 Caveats

A few methodological reservations must be made in relation to some of the findings of this report. On an international scale, this report uses fairly strong research designs, i.e. school fixed-effects analysis using longitudinal data that allow us to measure impact. Nevertheless, we cannot be sure that all measured correlations can be given a causal interpretation. For instance, in some cases there might be a third factor explaining developments in both management and implementation, learning, or well-being. Or, it could sometimes be a coincidence that management and implementation are moving in the same direction simultaneously.

Some of our management issues are measured using teachers' assessments, which is both a strength and a weakness. As shown in recent studies by Jacobsen & Andersen (2015) and Favero et al. (2017), teachers' perception of managerial behavior may have a greater impact on implementation and learning than managers' own responses indicate. This can be true if managers have responded, to some extent, in a way that they believe is expected from them (social desirability bias). Such expectations could, for example, be based on norms on good management practices, as reported in management literature. In such cases, the use of managers' responses about management could, all else being equal, lead to an underestimation of the effects of management.

On the other hand, it may be a weakness if we measure both explanatory management aspects and implementation using teachers' responses on both elements. There could be a certain risk of false correlations (common-source bias). This might occur for example if some teachers tend, in general, to use one end of the response scale (Favero & Bullock, 2015; Jakobsen & Jensen, 2015). However, some of our findings based on teachers' responses about management are supported somewhat by similar, parallel analyses, where we use principals' responses about management instead. This applies to analyses of the effects of managers' communication as part of change management and management involvement in pedagogics.

One final reservation should be that there appears to be some statistical correlation between some of our school management items. Therefore, certain findings may not reflect independent effects of individual management issues, but a group of management factors might express more general leadership styles in schools. This may imply that the findings have been overestimated in some cases and underestimated in others. However, several of the measured effects of management are so significant that there will probably still be a positive effect, even if it is overestimated.

Despite these reservations, we expect that, overall, the study's methods are stronger than in most international studies of school management, and that the results are reliable and can form the basis for action.

## 8 Conclusion and perspectives

As mentioned initially, the implementation of the public school reform already had rather poor prospects to begin with. Furthermore, nearly two years after its introduction it has only been implemented nationwide to a very limited extent (on average). Nevertheless, we have actually succeeded in identifying several management tools that appear to promote the implementation of the reform in teaching in schools. Apparently, the main implementation effects are achieved by:

- Professional, pedagogical leadership in the form of management involvement in the planning of curricula and methods
- Distributed pedagogical leadership via pedagogical learning communities among teachers.

We have found slightly smaller, but still substantial, positive implementation effects in cases where:

- Schoolteachers believe that they have a competent school principal.
- Managers use various change management elements. Management's communication of visions and action plans as well as interviews with individual employees about the future have significant effects, whereas the effects of the other change management elements are quite modest.

Overall, it appears that management issues close to schools' teaching and teachers are most effective in influencing the implementation of the public school reform into teaching in schools. Management issues that are farther away from a school's "engine room", however, seem to have little or no impact on the implementation. This applies to issues such as municipal control, including performance management and a dialogue between the municipality and the school, and a school's external management collaboration with stakeholders in the local community. It also applies to issues such as managers' participation in external management training programs and courses. In addition, it applies to internal performance management in schools, which is "farther away" from teachers and their teaching than a principal's involvement in pedagogics and pedagogical learning communities.

Some may contend that neither municipal nor internal performance are directly aimed at influencing the teachers' teaching practices, since these practices can be considered as means for achieving objectives, especially in relation to learning and well-being. It is remarkable, though, that stronger municipal or internal performance management, which aim to increase learning and well-being, do not have any significant effect on teachers' application of the teaching practices that the public school reform aims at using to achieve these goals. It appears that a strong relationship is missing between performance management and teachers' teaching.

It should also be mentioned that findings in Danish and international research on the isolated effects of use of municipal performance management vary a great deal (Møller et al., 2016; Hvidman & Andersen, 2013). More recent research suggests that the effects of performance management are often context sensitive, in depending, for example, on the composition of the overall package of management tools used at the school (Pedersen et al., 2017)

Our research demonstrates several effective management tools that can readily be applied in the daily life in schools. This especially applies to a more extensive use of pedagogical leadership with involvement in teachers' pedagogics and stimulation of professional learning communities among teachers. It also involves a more extensive use of change management, especially management's communication of vision, action plans, and interviews with individual employees for promoting reassurance.

There is a need for additional studies of several of these management issues to optimize their use further. For example, it could be interesting to clarify the significance of managers' knowledge about evidence of effective teaching methods in relation to the dialogue with teachers and to their teaching, if managers get involved in the teachers' pedagogics. The way in which evidence on effective teaching methods is incorporated into the activities of professional learning communities is also interesting, and how the interaction between management and the professional learning communities could be designed optimally.

Finally, there are many good reasons to search for new ways of achieving competence development among school managers. Teachers' teaching practices are very much influenced by their assessment of their management's skills, but not by the formal management skills acquired by managers through extended management training. A possible interpretation of the results could be that training has not been sufficiently tailored to the local school context and the pedagogical realities that managers experience. For instance, very few of the management training courses have focused on pedagogical leadership have included evidence on effective teaching methods. This also applies to training in how to utilize, in terms of management and pedagogics, existing data on pupils, e.g., test data, to achieve more effective teaching and improved learning.

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