

# Primary determinants of a large-scale curriculum reform – National board administrators' perspectives

## Abstract

The aim of the study was to gain a better understanding of how national board administrators, more precisely, officials at the Finnish National Board of Education (FNBE) have perceived the primary influencing factors, or “regulators”, of the national core curriculum reform and the success of the implementation. The alignment between the identified regulators was also explored. Altogether 23 FNBE officials participated in this mixed methods study. The results showed that the officials perceived the core curriculum reform as a systemic entity: the reform was implemented using a top-down–bottom-up strategy, and several regulators were identified at different levels of the education system. The officials also viewed the implementation as successful, and identified more promoting than hindering factors in it. However, they emphasised regulators at the administrative level, whereas regulators at the district or national levels were less often identified. They also highlighted the importance of orchestrating collaboration in comparison with the other regulators. The results imply that in addition to considering separate determinants of reform success, it is important to pay attention to sufficient alignment between the regulators at different levels of the education system in order to better understand and promote the implementation of a large-scale reform. This study provides new knowledge on national board administrators' perspectives on what regulates the implementation of a large-scale curriculum reform.

## Introduction

Curriculum reform is a central tool for school development (Vitikka et al., 2012). However, reforming the curriculum does not automatically result in sustainable

changes in the everyday practices of schools (Fullan and Miles, 1992). The reform implementation strategy has been shown to contribute to reform outcomes (Fullan, 2007; Petko et al., 2015). Due to the complex nature of school systems, the reform implementation is simultaneously affected by several complementary, sometimes even contradictory, factors at different levels of education system (e.g. Leithwood et al., 2002; Priestley et al., 2015; Tieso and Hutcheson, 2014). For instance, structures and resources, the understanding and attitudes of the stakeholders involved in the reform work as well as well as curriculum coherence, i.e., a clear, shared vision, and the alignment within the curriculum, are shown to be determinants of reform success (e.g. Cheung and Wong, 2012; Desimone, 2002; Newmann et al., 2001; Priestley et al., 2014; Reezigt and Cheemers, 2005). Also the alignment (see e.g. Murphy, 2013) between these influencing factors, or “reform regulators” may play a significant role in a reform’s success.

Previous studies on school reform, including curriculum reform, have focused heavily on school-level processes and outcomes (e.g. Coyle, 2008; Ramberg, 2014; Thoonen et al., 2012). It has been also showed that national board administrators set ambitious goals for the curriculum reform (Salonen-Hakomäki et al., 2016). However, we do not know how the national board administrators perceive the reform implementation and factors regulating it. Moreover, to be able to systematically utilise resources available and buffer problems proactively, research-based understanding on reform regulators is needed. This study aims to contribute to both on and the literature on large-scale school reform and curriculum reform work by shedding light on how national board administrators perceive the implementation strategy, and the primary regulators of a reform, and how aligned the regulators are.

## **Theoretical framework**

### ***The top-down-bottom-up reform implementation strategy***

Previous research on school reforms has implied that success of large-scale school reforms, such as the Finnish core curriculum reform, is influenced by the implementation strategy, including leadership and orchestration of the reform (Pietarinen et al., 2017; Ramberg, 2014). In particular, *the top-down–bottom-up implementation strategy* that integrates the initiatives from the administrative level, such as determining the general goals and offering support, and reform stakeholders’ active participation, is suggested to be effective in bringing about sustainable reform (Boone, 2014; Guhn, 2009; Horton and Martin, 2013; Petko et al., 2015; Priestley et al., 2015; Pyhältö et al., 2015; Ramberg, 2014; Toh, 2016). *A top-down–bottom-up strategy* has, for instance, been shown to enhance the perceived curriculum coherence within a large-scale curriculum reform (Pietarinen et al., 2017).

The top-down–bottom-up reform implementation strategy calls for leadership for *change management* and the *knowledge sharing* in curriculum reform. There is evidence that *leadership for change management* that involves several stakeholders and sharing responsibilities by distributing leadership responsibilities and creating ownership in decision making is an effective strategy in promoting the reform aims (Boone, 2014; Guhn, 2009; Jones et al., 2013; López-Yáñez and Sánchez-Moreno, 2013). Participative management promotes collaboration relying on mutual trust and appreciation of the expertise of others involved in the reform work (Adams, 2013; Chow, 2013; Kondakci et al., 2015). This further enhances the ability of those responsible for the reform to share knowledge and learn from each other (Coburn, 2005; Gawlik, 2015; Leana, 2011; López-Yáñez and Sánchez-Moreno, 2013; Ramberg, 2014; Thoonen et al., 2012).

*Knowledge sharing* comprises of constructing meaning of the reform through dialogue and negotiation (Coburn, 2005; Evans, 2007; März and Kelchtermans, 2013; Spillane et al., 2002; Weick et al., 2005). It has been shown that especially in ill-defined, complex, large-scale changes, reform stakeholders are less likely to change their pre-existing frames, and more differences in how the reform is understood are likely (Ketelaar et al., 2012; Könings et al., 2007). This means that knowledge sharing and collaboration between the actors from the different levels of the education system are needed in order to create curriculum coherence and the best fit between the reform goals and factual learning environment, that is a precondition for successful reform implementation (Könings et al., 2007; Ng, 2009; Pietarinen et al., 2017; Pyhältö et al., 2011; 2012; Yuen et al., 2012). Knowledge sharing enhance reformers' confidence in promoting change initiatives and taking risks to foster reform implementation (López-Yáñez and Sánchez-Moreno, 2013). Moreover, active participation in the construction of shared knowledge during a reform has shown to promote a more holistic understanding of the reform objectives, which in turn enhances the sense of ownership over the reform (Breiting, 2008; Ketelaar et al., 2012; Pyhältö et al., 2012; 2014). Ownership has further been recognized as an important element of reform success (Barone, 2013; Boone, 2014; Pyhältö et al., 2012; 2015).

The top-down-bottom-up strategy utilises both the state-level's ability to provide the framework, direction and resources to bring together broad networks, and the local-level stakeholders' ability to create, learn from, respond to, and feed into the new system (Fullan, 1994). For instance, in this approach the experiences and understanding of all who are involved in, and affected by the change are acknowledged and appreciated, and strong, transparent and knowledge-based leadership in steering the curriculum reform is carried out (Barone, 2013; Pietarinen et al., 2017; Spillane et al., 2002). Hence, the top-down-bottom-up approach utilises multiple sources of feedback, exercises leadership for

*change management*, and carries out an extensive *knowledge sharing* that strives to fit the new information into existing knowledge and beliefs related to the evidence-based improvements needed in the curriculum (März and Kelchtermans, 2013; Petko et al., 2015; Pietarinen et al., 2017; Ramberg, 2014; Thoonen et al., 2012).

### ***Factors regulating reform implementation***

A large-scale reform concerns all levels of the educational system (Guhn, 2009; Horton and Martin, 2013; Pyhältö et al., 2011). Accordingly, the factors affecting the reform implementation emerge from the system's different levels (see Table 1).

Table 1. Factors regulating reform implementation at different levels of education system.

<b>Level of national education system</b>	<b>Organisational level</b>	<b>Individual level</b>
Educational policy, legislation (Cheung and Wong, 2012; Desimone, 2002; Leithwood et al., 2002; Reezigt and Cheemers, 2005)	Leadership (e.g. Germeten, 2011; Hauge et al., 2014; Kurland et al., 2010; Soini et al., 2016; Priestley, 2011; Salfi, 2010; Thoonen et al., 2012)	Competences, expertise, understanding (e.g. Coburn, 2005; Day et al., 2016; Ketelaar et al., 2012; Könings et al., 2007; Salonen-Hakomäki et al., 2016)
Resources (financial, human resources, time) (Germeten, 2011; Keesing-Styles et al., 2014; Reezigt and Cheemers, 2005)	Involvement of teachers (Breiting, 2008; Desimone, 2002)  Collegial support, collaboration (Coyle, 2008; Ketelaar et al., 2012; Könings et al., 2007; Pyhältö et al., 2011; Ramberg, 2014; Scott and Bagaka's, 2004)	Opportunities to learn (Guhn, 2009; Keesing-Styles et al., 2014; Mendenhall et al., 2013; Salfi, 2010)  Attitudes (e.g. Binkhorst et al., 2015; Geijsel et al., 2001; Herscovitch and Mayer, 2002)

National level reform determinants such as resources and political structures ranging from legislation to funding are shown to have an impact on the curriculum reform implementation (e.g. Cheung and Wong, 2012; Reezigt and Cheemers, 2005). For instance,

adequate financial and human resources and the time allocated to a reform have been shown to be related to a reform's success (Germeten, 2011; Keesing-Styles et al., 2014; Reezigt and Cheemers, 2005). A shortage of funding and human resources can increase the risk of reform failure (Cheung and Wong, 2012; Leithwood et al., 2002). In addition, knowledge artefacts such as educational policy documents and legislation regulate reform work (Cheung and Wong, 2012; Reezigt and Cheemers, 2005). For example, the coherence and stability of education policy has been found to facilitate a reform's implementation (Desimone, 2002; Leithwood et al., 2002).

Moreover, a number of organisational attributes, including organisational culture and leadership, have been shown to have an effect on curriculum reform implementation. Leadership provided by the school administrators, principals and teachers can provide incentives and support for the reform (Germeten, 2011; Hauge et al., 2014; Kurland et al., 2010; Priestley, 2011; Salfi, 2010; Soini et al., 2016; Thoonen et al., 2012). School leaders can, for example, promote the implementation of a reform by creating an organisational culture that enables active teacher participation (Hallinger, 2003; Hallinger and Heck, 2011; Ho, 2010; Kondakci et al., 2015; López-Yáñez and Sánchez-Moreno, 2013; Mithassel et al., 2000), with the chief education officers having central roles in coordinating collaboration at the local levels (Barone, 2013; Fullan and Miles, 1992; Pyhältö et al., 2011). Stakeholders' active involvement has been associated with reform success (Breiting, 2008; Desimone, 2002). For instance, active teacher involvement promotes more holistic perceptions of the reform process and its objects (Pyhältö et al., 2012; 2014). Embracing a culture of trust and autonomy, and promoting teachers' agency over the curriculum reform, is suggested to increase teachers' engagement in the reform work and realisation of the aims in everyday school work (Adams, 2013; McCharen et al., 2011; Priestley, 2011). Moreover, collegial support and collaboration between the reform stakeholders has been shown to

promote the change (Cheung and Wong, 2012; Coyle, 2008; Ketelaar et al., 2012; Könings et al., 2007; Pyhältö et al., 2011; Ramberg, 2014; Scott and Bagaka's, 2004).

Individual attributes, such as stakeholders' competences and attitudes, regulate the success of a reform. Teachers' and administrators' expertise and attitudes, including their understanding of the reform, contribute to the way the reform is implemented (Cheung and Wong, 2012; Coburn, 2005; Day et al., 2016; Ketelaar et al., 2012; Könings et al., 2007; Priestley et al., 2014; Salonen-Hakomäki et al., 2016; Spillane et al., 2002). For instance, teachers' and principals' opportunities to engage in professional development in terms of the reform have been shown to facilitate the change (Guhn, 2009; Keesing-Styles et al., 2014; Mendenhall et al., 2013; Salfi, 2010). The stakeholders' attitudes towards the reform, such as levels of openness and commitment to change, have also been shown to influence the change outcomes (Binkhorst et al., 2015; Geijsel et al., 2001; Herscovitch and Mayer, 2002). For example, it has been suggested that teachers' positive emotions concerning the reform are likely to promote persistence in promoting the overall change (Leithwood et al., 2002).

Achieving sustainable changes provides that the primary regulators of the reform and their potential effects are considered in orchestrating the reform work (Fullan and Miles, 1992; Gu and Johansson, 2013). Also alignment, referring to the extent to which the reform regulators complement each other in promoting the desired outcomes, is suggested to be a central determinant of reform success (see Leithwood et al., 2002). If, for instance, the resources allocated to a reform are insufficient or incongruent with the aims, the reform is less likely to take root. This means that a regulator can promote or hinder the development work, depending on its alignment with other regulators. As national board administrators FNBE officials are responsible for administrating the Finnish national core curriculum reform, and play a central role in the reform's success by managing it. Therefore the officials' perceptions of the reform implementation and the primary regulators of the reform guide the

reform work. They determine, for instance, the types of resources that are utilised and the kinds of problems that are identified and buffered. Therefore, understanding of the regulators (i.e. promoting and hindering factors) and their alignment or lack of it, are important in promoting sustainable school reforms.

### ***National core curriculum reform in Finland***

The Finnish national core curriculum is a part of the educational steering system. It is reformed approximately every ten years. The Finnish educational system, including curriculum reforms, relies on flexible accountability structures and school and teacher autonomy emphasising trust in the schools (Aho et al., 2006; Sahlberg, 2015). At the national level, the Council of State provides the general goals for education and the frame for time allocations for various school subjects. The Finnish National Board of Education is responsible for reforming the national core curriculum based on these documents. The FNBE selects and invites stakeholders to participate in the reform work. Core curriculum reform work is organised into 34 working groups consisting of FNBE officials and invited stakeholders such as the researchers, educational professionals and textbook publishers. Education providers, individual schools and teachers and all citizens are asked to comment on the drafts of the national core curriculum through the internet. The national core curriculum includes the general objectives and core content of teaching, and describes the mission, values and structure of the overall education (Vitikka et al., 2012). The general values of basic education defined by the national core curriculum are human rights, equality, democracy, natural diversity, preserving environmental viability and endorsing multiculturalism (The Finnish National Board of Education, 2014). Education providers, typically the municipalities, are responsible for constructing the local curriculums based on the national core curriculum. Municipalities and individual schools have the freedom to



decide on the educational emphasis, teaching methods and learning material. They are also allowed to determine the way in which they organise the local curriculum reform work.

### **Aims of the study**

The study aims to gain a better understanding of how national board administrators i.e. FNBE officials, perceive the implementation strategy and the factors regulating the implementation, and how aligned the regulators are. The following research questions were addressed:

1. How did the FNBE officials perceive the reform implementation strategy and evaluated success of the reform? (quantitative data)
2. What kinds of hindering and promoting regulators of the reform the officials identified? (qualitative data)
3. How the regulators identified by the officials were aligned? (quantitative and qualitative data)

### **Methods**

#### ***Participants***

Twenty-seven officials from the FNBE were requested to participate in the study. The officials were selected because they were central stakeholders responsible for managing the reform. All had acted as either chairpersons, secretaries or presenters in the core curriculum reform working groups. Altogether 20 officials completed the survey, and 23 participated in the interviews. The response rate for the survey was 74.1%, and 85.2% for the interviews. The majority of the officials (70%) had previous experience in core curriculum reform work. The working history of the participants varied: prior to their current posts, some

had worked as teachers, principals or chief education officers and others had worked as teacher educators or researchers.

### ***Instruments and data collection***

A mixed methods approach was adopted for the study (Creswell and Plano Clark, 2011), including the use of both quantitative and qualitative data through a convergent design.

*Quantitative data.* Scales for the quantitative part of the study were developed by Pietarinen et al. (2017). *The top-down–bottom-up implementation strategy scale* comprised of *knowledge sharing* (13 items) and *change management* (3 items) (Pietarinen et al., 2017). The structure of the scale was previously confirmed (Pietarinen et al., 2017). *Success of the core curriculum reform implementation* was measured with one item. Items of *the top-down–bottom-up implementation strategy scale* were rated on seven-point Likert-scales and *success of the core curriculum reform implementation* was rated on a ten-point scale. The descriptive statistics of the scales and Cronbach alpha coefficients are shown in Table 2 (see also Appendix 1). The survey data were collected during the autumn of 2014 via electronic form.

*Qualitative data.* Interviews with the officials were conducted in the middle of the core curriculum reform process (2013–2014) in the spring of 2014. A semi-structured interview protocol was used (Salonen-Hakomäki et al., 2016), and was piloted and revised before the data collection. Each interview consisted of 36 questions concerning six themes: *the aims of the reform, the core curriculum reform process as a whole, group work within the reform, the interviewee’s role in the process, the interviewee’s thoughts on the local implementation, and the meaning of the reform.* In addition, five background questions on the participants’ education, working history and responsibilities were included. Each interview

lasted between 45 and 90 minutes. The interviews were recorded and fully transcribed before the analysis.

Participation in the interviews and survey was voluntary, and research permission was received from the FNBE and the participants.

### ***Data analysis***

A convergent parallel design was employed in the data analysis (Creswell and Plano Clark, 2011). Quantitative and qualitative data were analysed separately, and were combined at the intermediate stage of the study. The data sets provided different aspects of the reform implementation, and by combining them it was possible to gain a more comprehensive understanding of the core curriculum reform (Bryman, 2006; Creswell and Plano Clark, 2011; Greene et al., 1989). Quantitative data were utilised to better understand how the officials perceived the reform implementation strategy. Qualitative data were used to explore what kinds of primary regulators the officials perceived at different levels of the education system. Quantitative data were also used to examine the overall success of the reform implementation perceived by the officials. Both qualitative and quantitative data were used to investigate the alignment between the regulators identified by the officials.

*Quantitative analysis.* The top-down–bottom-up implementation strategy scale was previously confirmed (Pietarinen et al., 2017), including both explorative and confirmatory factor analyses that were carried out in order to determine the structure of the scale. Descriptive statistical analyses were carried out using IBM SPSS Statistics 21. To determine how the officials perceived the implementation strategy and the success of the implementation, the means and standard deviations were calculated. Due to the small sample size, the interrelations between the factors were explored with Kendall’s tau coefficients.

*Qualitative data.* The interviews were content analysed (Elo and Kyngäs, 2008; Schreier, 2012). The analysis consisted of four complementary phases, as follows. (I) All text segments in which officials described the factors regulating the reform process were first selected for the analysis using inductive strategy. (II) The factors were then coded into two exclusive main categories: *promoting*, entailing factors facilitating or supporting the process, or being successful, and *hindering*, including factors impeding the reform process, making it more difficult, or being unsuccessful. This phase was carried out deductively. (III) The two main categories were coded into three exclusive subcategories according to their content, using an inductive strategy: *expertise and attitudes*, *orchestration of collaboration*, and *structures and resources*. (IV) Finally, the main categories were coded according to the level to which the hindering and promoting factors were attributed. A deductive strategy was used during this phase. Three levels were identified: *national*, *administrative* and *district*. The categories resulting from the content analysis were validated by the research group (Miles and Huberman, 1994). A parallel analysis for 30% of the data was carried out for phases II, III, and IV. In cases of disagreement, a consensus of categorisation was achieved through negotiation between the researchers.

## **Results**

### ***Perceptions of the implementation strategy and success of the reform***

The FNBE officials reported fairly high scores for the top-down–bottom-up implementation strategy both in terms of *knowledge sharing* and leadership for *change management* (see Table 2). They perceived that the different stakeholders ranging from the teachers to themselves were able to participate in the reform work and contribute to it. The officials also perceived that the perspectives and competences of all stakeholders were utilised in an optimal manner. Moreover, according to them the collaborative working

methods were adopted, and decision-making concerning the reform was based on negotiations. In addition, they perceived the leadership practices, the dissemination of information, and the division of work to be adequate. The officials also considered the reform as a whole to be successful ( $M=8.05$ ;  $SD=1.72$ ). However, the relatively high standard deviation of the reform implementation's perceived success suggested that despite having positive views about the reform implementation in general, the officials' perceptions varied. Positive interdependency between the knowledge sharing, change management and estimated reform success [ $r^{(\text{min-max})} = .617-.671$ ] were detected, implying alignment between the ingredients of top-down-bottom-up reform implementation strategy.

Table 2. Correlations between the scales and descriptive statistics of the scales.

	1.	2.	3.
1. Knowledge sharing	-		
2. Change management	.617	-	
3. Success of the implementation	.658	.671	-
<i>M</i>	5.46	5.28	8.05
<i>SD</i>	1.33	1.07	1.72
Min/Max	1.23/6.69	2.67/6.67	2/10
$\alpha$	.98	.92	

Note. Knowledge sharing and change management were rated on 7-point Likert scales, and success of the implementation was rated on a ten-point scale.

### ***Perceptions of the reform regulators***

The FNBE officials identified several factors – both hindering and promoting – as regulating the core curriculum work at different levels of the education system. These regulators are shown in Figure 1. The regulating factors varied between the levels, and the division between the hindering and promoting factors altered according to each level. As well, different factors were perceived to regulate the process at different levels.

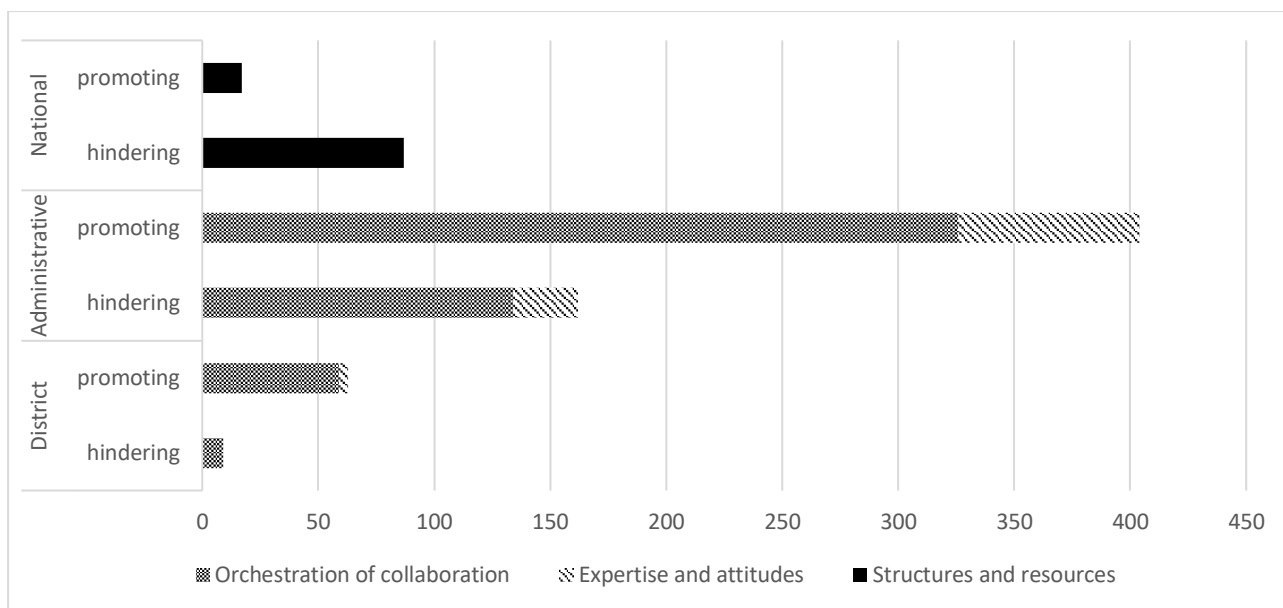


Figure 1. Multilevel regulators of the core curriculum reform.

At the *national level*, comprising the educational steering system, the officials identified structures and resources allocated to the curriculum reform as the reform’s primary regulators. In particular, school legislation and other steering documents, funding, and time allocated to the reform work were emphasised. The national-level regulators were more often perceived to have been hindering rather than promoting the reform work. Lack of sufficient funding and lack of time allocated to the reform work were typically perceived by the officials as hindrances, whereas sustainable school legislation was identified as a central structural asset enabling the reform work by providing a solid base to build on.

We have practically no money for this [core curriculum] work. This hampers [it]. We do not really have money to invite. [...] If inviting experts from outside the working groups requires money, it is highly restricted. [...] This is somewhat insane, and I do not know why we have to do this practically in addition to other duties and why we are not allowed to invite who we like to hear in the working groups. [...] This is of course a problem, that money is regulating these kinds of things (I)

At the *administrative level*, referring to the FNBE and the working groups consisting of members of the FNBE and the invited stakeholders, the officials perceived the orchestration of collaboration within and between the invited working groups responsible for writing the core curriculum, as well as the competences and attitudes of the FNBE officials and working group members, as the primary regulators of the reform. The officials more often mentioned promoting factors than hindering ones. The orchestration of collaboration was typically perceived as a central asset in the reform work. Considered particularly functional at this level were the organisation of the core curriculum work, the selection of invited working group members, and the chosen working methods. Expertise and attitudes, such as the competences, experience and commitment of the invited stakeholders, were less often seen as central regulators of the core curriculum work; however, when identified, they were typically considered to be facilitators of the work. Although the officials favourably perceived both the orchestration of collaboration and the expertise and attitudes typically promoting the core curriculum work, failures in providing sufficient opportunities for interaction and support for the working groups, as well as inadequate understanding of the nature of the process, were sometimes identified as hindering the core curriculum work.

It has definitely [been important] that we did not hurry with starting the work concerning the school subjects; we had time to do the general part well and then we agreed with the subject working groups that they wouldn't hurry [...] unless they carefully thought through their relation to the general lines, and start with writing down the purpose and function of their own subjects, why it is important for a child to learn these things today; they explained it to themselves and wrote it down [...] and that, I think, was an important and correct decision.

(K)

The *district level* comprised the education providers, i.e., municipalities, schools and individuals. The officials identified the lowest number of regulators at the district level. Most of the promoting factors reported by the officials were related to the orchestration of collaboration. Asking for and receiving feedback at this level were typically perceived as promoting the reform work, while insufficient participation of district-level entities, or problems regarding communication between the administrative and local levels, were considered a hindrance. The expertise and attitudes of the district-level stakeholders were rarely described.

I think that it has been great that the feedback process has been holistic. [...] Open commenting through the website has been an important work phase, because this feedback has really been taken into account. Although the texts were quite ready-made and we [the FNBE officials] were satisfied with them [...], the field saw a need to improve them, and now we have re-written those texts [...] and went through every single item of feedback. (S)

### ***Regulator alignment***

The FNBE officials identified more promoting rather than hindering factors in the core curriculum reform work. The officials' perceptions of the implementation strategy were also internally coherent, as the officials evaluated all aspects of top-down–bottom-up implementation strategy to be sufficient. Positive association between the knowledge sharing and change management also indicated alignment between the main ingredients of top-down–bottom-up reform implementation strategy.

Differences were found in the division of promoting and hindering factors between the levels. At the national level, the officials identified mainly hindering factors, whereas at the administrative and district levels mainly promoting factors were recognised. In



addition, different factors were identified as hindering and promoting: orchestration of collaboration was emphasised as a promoting factor, while structures and resources were mainly identified as hindering. The nature of the regulators also varied between and within the levels. At the national level, the officials emphasised structures and resources whereas the orchestration of collaboration was highlighted at the administrative and the district levels. Further, a variation in the emphasis placed on the different regulators within the levels was found. For instance, at the district level the officials identified orchestrating collaboration as a key regulator, and expertise and attitudes were rarely mentioned.

## **Discussion**

### ***Methodological reflections***

Finnish national board administrators' (i.e. FNBE officials') perceptions of curriculum reform were investigated here, providing a fuller understanding of the regulators of a large-scale reform. However, the data only represents the views of the national board administrators. Further studies are needed to explore how curriculum reform and its implementation is perceived by other stakeholders, including those responsible for reform at the local level. In addition, longitudinal studies are needed in order to investigate the impact of curriculum reform on the everyday life of schools.

Response rates for both the survey and the interviews were high. Accordingly, the sample represented well the FNBE officials who were in charge of the reform. However, the sample size was small. Due to the distinctive features of the Finnish education system further studies are needed to validate the findings in other countries.

The convergent parallel mixed methods design allowed for an exploration of the perceived regulators and success, as well as regulator alignment, of a large-scale reform implementation. The interviews provided rich data concerning the core curriculum reform as

perceived by the officials involved. By synthesising quantitative and qualitative data, a comprehensive understanding of the regulators, their alignment, and the overall success of the reform implementation was attained (Creswell and Plano Clark, 2011).

### *Conclusions*

The aim of this study was to contribute to the literature on school reforms by exploring how national board administrators perceived the reform implementation strategy, regulators of a reform and regulator alignment and success of a reform.

The results showed that the FNBE officials perceived that the reform was implemented through a top-down–bottom-up approach. The results also suggested that the top-down–bottom-up implementation strategy, comprised of change management and knowledge sharing, may provide a mean to foster reform success. Further large scale studies are however needed to explore the interrelation. Officials identified a variety of reform regulators at the different levels of the education system. This implies that the FNBE officials perceived the core curriculum reform as a systemic entity, comprising several levels of the education system, and affected by multiple factors simultaneously. The officials emphasised particularly orchestrating collaboration as a central resource for promoting the core curriculum reform, while expertise and attitudes as well as structures and resources were less often identified. Orchestration of collaboration was particularly emphasised as an asset at the administrative level. The finding implies that the officials considered creating arenas for collective sense-making and promoting stakeholders' participation as a key for reform success. At the national level the officials emphasised such factors as financial resources and the coherence and stability of education policy as central regulators for core curriculum reform success, whereas at the district level, orchestrating collaboration, the expertise and attitudes of those involved in the process were considered to be the primary regulators of the

reform. The core curriculum regulators identified by the FNBE officials were sufficiently in line with the sustainable reform determinants identified in the school reform literature (Cheung and Wong, 2012; Desimone, 2002; Geijsel et al., 2001; Kondacki et al., 2015; Könings et al., 2007; Leithwood et al., 2002; Luttenberg et al., 2013; Ramberg, 2014; Reezigt and Cheemers, 2005; Salfi, 2010).

The officials viewed the core curriculum reform implementation as successful and identified more promoting than hindering factors in it. However, the promoting and hindering factors were unevenly distributed and emphasised across the different levels. Most of the regulators were identified at the organisational, particularly at administrative level, whereas regulators at the district and the national levels were less often mentioned. The regulators identified at the administrative and district levels were primarily positive, whereas hindrances were emphasised at the national level. Overall, organisational regulators were emphasised over individual and national education system level regulators. This suggests that even though the officials perceived the reform to be successful, the alignment between the reform regulators was less than optimal.

The fact that the officials here did not often identify the regulators at the district level suggests that the promotion of district-level actors' participation was limited. If issues and concerns related to the fit between district and administrative levels go unconsidered, it may cause discrepancies in the reform work. For example, although an opportunity for online commenting on the core curriculum drafts was provided for all district-level actors, only stakeholders with sufficient IT skills were able to participate. This kind of discrepancy may in some cases jeopardise the district-level actors' sense of ownership over the reform, which has been previously recognised as a determinant of reform success (e.g. Breiting, 2008; Desimone, 2002; Pyhältö et al., 2012; 2014). However, teacher participation

was to a certain extent engineered into the core curriculum process in the form of invited teacher representatives in the national-level core curriculum working groups.

Financial resources were mostly recognised as a hindering regulator at the national level. At the same time, the officials did not identify orchestrating collaboration at this level. This implies that national level actors were not considered as partners in collaboration, which may also lead to not utilising social resources of national level. If the potential of reorganising the structures and resources within the administrative and district levels is not recognised, the full potential of these resources in promoting core curriculum reform cannot, in turn, be realised. This implies that a lack of alignment between the reform-promoting factors as well may put at risk both the success of the core curriculum reform and the occupational well-being of those involved. More specifically, the uneven emphasis on the resources may lead to an over-utilisation of these resources, resulting in an excessive workload at this level. Hence, work overload related to the complex orchestration of the educational change, i.e. curriculum reform, has been shown to increase the risk for work stress and reform failure (Cox et al., 2000; van der Merwe and Parsotam 2012; Cheung and Wong, 2012; Reezigt and Cheemers, 2005).

Accordingly, we propose that in addition to considering the separate determinants of curriculum reform success, such as implementation strategy and resources (see e.g. Fullan, 2007; Petko et al., 2015; Pietarinen et al., 2017; Reezigt and Cheemers, 2005), it is important to pay attention to the sufficient alignment of regulators at different levels of the education system. In addition, the effect of the reform implementation strategy on well-being of the reform stakeholders needs to be more closely examined in future studies in order to better understand and promote the implementation of a large-scale reform and well-being of the stakeholders.

The findings imply that in order to achieve sustainable changes through curriculum reform, the reform stakeholders need to understand the interdependency of the levels of educational system, including realising that actions taken on one level influences other levels as well. More specifically, a good balance of top-down and bottom-up elements in implementation, i.e. sufficient steering and simultaneous facilitation of participation and ownership, seemed to be the most beneficial strategy in terms of succeeding in curriculum reforms across the levels. Accordingly, the degree of alignment between the regulators could be increased by promoting negotiations between and within the levels of educational system (see Könings et al. 2007; Soini et al., 2016; Vennebo and Ottesen, 2014).

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## Appendix 1.

Descriptive statistics of the items.

	<i>M</i>	<i>SD</i>
<b>Top-down-bottom-up implementation strategy</b>		
<u>Knowledge sharing</u>		
<i>I have been able to influence definitions and contents.</i>	5.90	1.59
<i>My competence has been utilised broadly.</i>	5.50	1.54
<i>Decisions are based on joint negotiations.</i>	5.80	1.47
<i>The feedback received has influenced the content of the curriculum.</i>	6.15	1.53
<i>It is impossible for individuals to push through their opinions. (R)</i>	5.15	1.46
<i>The reform is not based on initiatives submitted by schools. (R)</i>	5.37	1.30
<i>Even radical ideas are welcome, and they are discussed jointly.</i>	5.45	1.70
<i>Work on the reform has been carried out jointly, not as a process dictated from above.</i>	5.45	1.67
<i>The competence of various actors has been utilised in an optimal manner.</i>	5.00	1.59
<i>Construction of an interactive atmosphere has been successful.</i>	5.60	1.50
<i>Educational practitioners have participated in a work sufficient variety of ways.</i>	5.70	1.59
<i>Working together is assessed on a regular basis.</i>	4.95	1.50
<i>The perspectives of the various teacher groups have been taken into account in an equal manner.</i>	5.00	1.56
<u>Change management</u>		
<i>Management has been a success.</i>	5.25	1.48
<i>The dissemination of information has been sufficient.</i>	5.35	1.09
<i>A clear division of work has been performed.</i>	5.25	1.21
<b>Success of the implementation</b>		
<i>As a whole, curriculum reform has been successful.</i>	8.05	1.72

Note. Knowledge sharing and change management were rated on 7-point Likert scales, and success of the implementation was rated on a ten-point scale.