



Journal of Educational Administration

Differences in state- and district-level stakeholders' perceptions of curriculum coherence and school impact in national curriculum reform

Jenni Sullanmaa, Kirsi Pyhältö, Janne Pietarinen, Tiina Soini,

Article information:

To cite this document:

Jenni Sullanmaa, Kirsi Pyhältö, Janne Pietarinen, Tiina Soini, (2019) "Differences in state- and district-level stakeholders' perceptions of curriculum coherence and school impact in national curriculum reform", Journal of Educational Administration, Vol. 57 Issue: 3, pp.210-226, <https://doi.org/10.1108/JEA-08-2018-0153>

Permanent link to this document:

<https://doi.org/10.1108/JEA-08-2018-0153>

Downloaded on: 06 June 2019, At: 03:16 (PT)

References: this document contains references to 56 other documents.

The fulltext of this document has been downloaded 170 times since 2019*

Users who downloaded this article also downloaded:

(2019), "Leadership matters: preparation program quality and learning outcomes", Journal of Educational Administration, Vol. 57 Iss 2 pp. 185-206 https://doi.org/10.1108/JEA-05-2018-0093

(2019), "The role of district leaders for organization social capital", Journal of Educational Administration, Vol. 57 Iss 3 pp. 296-316 https://doi.org/10.1108/JEA-03-2018-0045

Access to this document was granted through an Emerald subscription provided by All users group

For Authors

If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com

Emerald is a global publisher linking research and practice to the benefit of society. The company manages a portfolio of more than 290 journals and over 2,350 books and book series volumes, as well as providing an extensive range of online products and additional customer resources and services.

Emerald is both COUNTER 4 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

*Related content and download information correct at time of download.

Differences in state- and district-level stakeholders' perceptions of curriculum coherence and school impact in national curriculum reform

Jenni Sullanmaa

Faculty of Educational Sciences, University of Helsinki, Helsinki, Finland

Kirsi Pyhältö

*Faculty of Educational Sciences, University of Helsinki, Helsinki, Finland and
Faculty of Education, University of Oulu, Oulu, Finland*

Janne Pietarinen

*School of Applied Educational Science and Teacher Education,
University of Eastern Finland, Joensuu, Finland, and*

Tiina Soini

Faculty of Education and Culture, Tampere University, Tampere, Finland

Abstract

Purpose – Shared understandings of curriculum reform within and between the levels of the educational system are suggested to be crucial for the reform to take root. The purpose of this paper is to explore variation in perceived curriculum coherence and school impact among state- and district-level stakeholders.

Design/methodology/approach – The participants ($n = 666$) included state- and district-level stakeholders involved in a national curriculum reform in Finland. Latent profile analysis was employed to identify profiles based on participants' perceptions of the core curriculum's coherence and the reform's impact on school development.

Findings – Two profiles were identified: high coherence and impact, and lower consistency of the intended direction and impact. State-level stakeholders had higher odds of belonging to the high coherence and impact profile than their district-level counterparts.

Practical implications – The results imply that more attention needs to be paid in developing a shared and coherent understanding particularly of the intended direction of the core curriculum as well as the reform's effects on school-level development among state- and district-level stakeholders.

Originality/value – The study contributes to the literature on curriculum reform by shedding light on the variation in perceived curriculum coherence and school impact of those responsible for a large-scale national curriculum reform process at different levels of the educational system.

Keywords Curriculum reform, Latent profile analysis, Curriculum coherence, School impact

Paper type Research paper

Introduction

It has been proposed that in order to promote curriculum reform implementation and educational practitioners' ownership over the reform, the curriculum developers and stakeholders need to build a sufficiently shared understanding of the functions of the

© Jenni Sullanmaa, Kirsi Pyhältö, Janne Pietarinen and Tiina Soini. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial & non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

This work was supported by the Ministry of Education and Culture under Grant No. 6600567; and the Academy of Finland under Grant No. 295022.



curriculum and its meaning for the schools' mission (see Fullan, 2007; Ornstein and Hunkins, 2004; Pietarinen *et al.*, 2017). At the same time, there is evidence of educational administrators, stakeholders, principals and teachers often differing in their understanding and response to educational change and curriculum reforms (Desimone, 2006; Louis and Robinson, 2012; Ng, 2009; Spillane, 1998; Timperley and Parr, 2005; Yuen *et al.*, 2012). Perceiving the curriculum as a coherent whole is particularly important for those in charge of developing and implementing the curriculum because it provides grounding for sustained goal setting and reform implementation. While coherence in terms of alignment and continuity within and between the elements of the curriculum (e.g. Newmann *et al.*, 2001; Schmidt *et al.*, 2005; Smith *et al.*, 1998) and in terms of providing a coherent basis for constructing shared understandings of the curriculum's aim and shared principles and values for teaching and learning (e.g. Bryk, 2010; Hallinger and Heck, 2002; Newmann *et al.*, 2001) is suggested to be crucial to support pupil learning and school development, research on how curriculum coherence is perceived by different stakeholders is scarce. A few studies have implied that teachers' perceptions of school-level coherence are related to pupil achievement (e.g. Newmann *et al.*, 2001) and that perceptions of coherence between policies, goals and activities within and between schools and the educational system are important for reform to take root (e.g. Allen and Penuel, 2015; Louis and Robinson, 2012; Russell and Bray, 2013). Our earlier studies suggested that state- and district-level stakeholders' perceptions of core curriculum coherence are related to the expected school-level impact of a curriculum reform (Pietarinen *et al.*, 2017; Sullanmaa *et al.*, submitted). This implies that perceived curriculum coherence is an important determinant of facilitating change in schools. State- and district-level stakeholders do not, however, comprise a single entity, and differences are likely to occur both within and between the groups.

The present study aims to contribute to filling this gap in the literature by exploring how state- and district-level stakeholders involved in Finnish national core curriculum reform have perceived curriculum coherence and the reform's impact on school-level development. Variation in the stakeholders' perceptions is examined by discerning latent profiles, that is, detecting subgroups of educational stakeholders based on their individual patterns of perceived curriculum coherence and expectations of the reform's school-level impact. Examining similarities and differences in perceived curriculum coherence among the stakeholders at different levels provides a systemic understanding of how such coherence is achieved in a large-scale curriculum reform process. Accordingly, the study contributes to the literature on curriculum development by providing a novel understanding of the variation in the perceptions of stakeholders in charge of the development work.

Curriculum coherence

A coherent curriculum entails unity and connectedness among the aims, content, instructional practices, learning experiences and assessments (Beane, 1995; Kelly, 2009; Smith *et al.*, 1998). It entails a holistic and integrative approach to curriculum development, focusing on the learners and their purposeful learning experiences (Beane, 1995; Ornstein and Hunkins, 2004). Curriculum coherence also includes a structural approach focusing on the alignment and the coherent organization of subject matter (e.g. Schmidt *et al.*, 2005; Squires, 2009). This study explores how different educational stakeholders have perceived the coherence of the core curriculum that aims to guide the district-level curricula and further governs the development of the national basic education system.

Curriculum coherence is suggested to be comprised of three interrelated components: consistency of the intended direction, referring to the clarity of the goals and roles of the teachers and schools, as well as the ability to support the teaching of the essential material; an integrative approach to teaching and learning, entailing the encouraging of teachers to use activating teaching methods along with assessment that supports

learning, as well as support for the harmonization of teaching; and alignment between objectives, content and assessment, characterized by continuity and connectivity within the curriculum (Sullanmaa *et al.*, submitted).

Consistency of the intended direction is important for facilitating the shared ownership of clear aims in the educational system. Schools are facing multiple demands from within as well as outside the schools, for instance from parents and the wider community (see Honig and Hatch, 2004). Hence, it is essential that the curriculum provides grounding for navigating between the contradictory demands and that it establishes a clear direction for school practice and its development, as well as realizes the practical outcomes and benefits of the reform (Ornstein and Hunkins, 2004; Timperley and Parr, 2005). It has been suggested that the curriculum needs a shared and consistent purpose, which creates coherence in diverse school-level activities (Fullan, 2007). Schools that successfully improve their practice have a shared sense of direction among the school community (Hallinger and Heck, 2002; Newmann *et al.*, 2001; Reezigt and Creemers, 2005). In addition, without clarity about the curriculum reform's aims and main message, the local implementing stakeholders might gain very different understandings of the change (Spillane and Callahan, 2000; Timperley and Parr, 2005). For instance, teachers might not change their classroom practices accordingly due to not fully understanding the underlying principles of the reform (e.g. Ng, 2009) or insufficient clarity about changes in their roles. Consistency of the intended direction, however, does not mean that the curriculum should be implemented similarly in all contexts (also see Buchmann and Floden, 1992). It is crucial to communicate the key purposes and underlying principles of the curriculum (Spillane *et al.*, 2002); yet, an adaptive approach also recognizes contextual conditions at the school level and allows for diversity in the implemented curriculum (Buchmann and Floden, 1992; Darling-Hammond, 1998; Ornstein and Hunkins, 2004).

A coherent curriculum also provides an integrative approach to teaching and learning that is consistent with the educational values, objectives and content of the curriculum. Successful reforms focus on developing the core school practices of teaching and learning as well as altering teachers' beliefs, norms and pedagogical practices (Coburn, 2003; Darling-Hammond, 1998; Elmore, 1996). These core beliefs include teachers' understanding about how students learn, the nature of knowledge and subject matter, and how this is shown in their teaching practice (Coburn, 2003; Elmore, 1996). A curriculum reform that aims to impact the core of schooling requires a shared understanding and commitment to the reform principles and goals of teaching and learning, as well as school-level capacity building and support for the new practices at the local level (Darling-Hammond, 1998; Fullan, 2009; McLaughlin, 1998; Porter *et al.*, 2015). The administrators and stakeholders involved in curriculum development have a key role in developing coherence in teaching and learning, and in facilitating commitment to and support for this development throughout the various levels of the educational system (see Cantlon *et al.*, 1990; Dutro *et al.*, 2002; Porter *et al.*, 2015; Spillane, 2004).

Curriculum coherence also includes alignment and continuity within and between the curriculum's objectives, content, teaching methods and assessments. Alignment is essential for the construction of integrated, consistent and meaningful learning experiences that build sequentially and reinforce one another (Beane, 1995; Fortus *et al.*, 2015; Schmidt *et al.*, 2005). Alignment between goals, instruction and assessments (e.g. Squires, 2009, 2012), and the sequencing and progression of content within and across grades (e.g. Fortus *et al.*, 2015; Schmidt *et al.*, 2005; Schwartz *et al.*, 2008) have been shown to improve pupils' deep learning and school achievement. Perceptions regarding a curriculum's alignment and continuity are also important among teachers and other educational stakeholders for understanding and accepting the curriculum as a sensible whole (see Vitikka *et al.*, 2012). Alignment as a part of curriculum coherence needs to be considered simultaneously with the curriculum's intended

direction and the framework for developing teaching and learning. Hence, all three components of coherence in the steering core curriculum are assumed to contribute to the curriculum reform's impact on the school-level development work.

Function of coherence in curriculum reform

The effects of curriculum reform on school-level practice and development, particularly on a large scale or long-term basis (see, e.g. Coburn, 2003; Elmore, 1996), depend on the interaction between the stakeholders at different levels of the educational system and their understanding of the curriculum reform (e.g. Cheung and Wong, 2011; Fernandez *et al.*, 2008; Fullan, 2007; Ng, 2009; Timperley and Parr, 2005; Yuen *et al.*, 2012). High levels of perceived coherence in the core curriculum have been shown to contribute to district-level stakeholders' expectations of the impact that the curriculum reform will have on school-level development, by directing the development work toward solving problems faced by schools, and committing teachers to the development work (Sullanmaa *et al.*, submitted).

However, the stakeholders may differ regarding the extent to which they perceive the curriculum as a coherent whole and believe in its impact on the school-level development, how much time and effort they are ready to invest in the reform implementation, and what they aim to emphasize when developing the local curriculum (Cantlon *et al.*, 1990; Duto *et al.*, 2002; McLaughlin, 1998; Spillane, 1998). The various stakeholders' expectations concerning the reform's impact are influenced by their understanding of the curriculum reform, their role in the educational system, their expertise and previous experience and local values (Spillane *et al.*, 2002; Spillane, 2004). This means that the curriculum reform is reconstructed at each level of the educational system as it is interpreted by different stakeholders and then mediated to the next level (Coburn, 2005; Darling-Hammond, 1998; Louis and Robinson, 2012; Nordholm, 2016; Porter *et al.*, 2015). Thus, coherent perceptions about the core curriculum and beliefs about the reform's impact on school-level development among stakeholders at different levels of the system are essential in facilitating school development. Due to the different positions and activities that the stakeholders and practitioners across the educational system have in curriculum development work, variation in perceived curriculum coherence and beliefs about the reform's impact on school-level development is likely to occur (see Desimone, 2006; Louis and Robinson, 2012; Spillane, 1998). Still, little is known about how curriculum coherence is perceived by those involved in national or district-level curriculum development, how the experiences of stakeholders at different levels are related, or how the possible differences could be bridged to achieve stronger agreement and coherence.

Curriculum reform in Finland

The educational system in Finland aims to facilitate stakeholders' coherent understandings about the curriculum by involving stakeholders from different levels of the educational system in the curriculum reform process and by emphasizing collaboration and shared goals among educational administrators, stakeholders and practitioners in the reform orchestration (Salonen-Hakomäki *et al.*, 2016; Tikkanen *et al.*, 2017; Vitikka *et al.*, 2012). The national core curriculum, based on the Basic Education Act, is part of the Finnish educational steering system which outlines the mission, key objectives and core content of basic education (Vitikka *et al.*, 2012). The Finnish National Agency for Education (formerly the Finnish National Board of Education) is responsible for orchestrating reform of the core curriculum approximately every 10 years. The most recent reform was launched in 2012. The Finnish National Agency for Education invited various stakeholders such as municipal education providers, teacher educators, researchers, principals and teachers to participate in working on different parts and content of the core curriculum. These state-level working groups were also responsible for writing the final core curriculum document, completed at

the end of 2014. The core curriculum includes the main objectives and core content, and represents an outline to be collaboratively developed for local curricula by the districts and municipalities (Vitikka *et al.*, 2012). It functions as a tool for developing a shared understanding of the values and aims of teaching and learning, and as a basis upon which teachers can build their pedagogical practices (Vitikka *et al.*, 2012).

The local education providers in Finland have autonomy in organizing education. In the reform process, they are responsible for constructing new local curricula within the framework of the reformed national core curriculum. Generally, the local curriculum is constructed as a joint curriculum for a district or for an individual municipality. The district-level curriculum is developed in collaboration between municipal actors and school staff. The district-level working groups construct a local curriculum that emphasizes the core curriculum content from a local perspective, taking into account contextual factors such as local needs and traditions (Finnish National Board of Education, 2014). The local curricula were to be finished by the spring of 2016 and implementation in schools began in stages in the fall of 2016.

Quality, equity and trust are some of the basic values on which school development is based in Finland (see Sahlberg, 2015). Accordingly, the core curriculum process aims to promote agreement between educational stakeholders at different levels on goals and expectations regarding the curriculum reform (Pietarinen *et al.*, 2017), and the purpose of the local autonomy of the curriculum implementation is to facilitate the commitment of local stakeholders (Vitikka *et al.*, 2012). Hence, coherence-making in the curriculum reform process is particularly important in the Finnish educational system, which emphasizes the autonomy of schools and teachers and relies on them to engage in active school development work to put the national curriculum reform into practice.

Aim of the study

The aim of this study was to explore state- and district-level stakeholders' perceptions of curriculum coherence and school impact in the context of Finnish national curriculum reform. Subgroups of stakeholders were identified based on the perceived curriculum coherence and school impact using latent profile analysis (LPA). It has been suggested that a certain level of agreement about a curriculum's meaning, goals and effects between the state and district levels is key to facilitating curriculum reform implementation and promoting school-level ownership and development (see, e.g. Dutro *et al.*, 2002; Fullan, 2007; Timperley and Parr, 2005). Accordingly, the following hypotheses were tested:

- H1.* Different profiles based on perceived curriculum coherence, consisting of consistency of the intended direction, integrative approach to teaching and learning, alignment between objectives, content and assessments, and perceived school impact can be detected.
- H2.* The state-level administrators in charge of constructing the national core curriculum, and the district-level stakeholders involved in the development of local curricula on the basis of the national core curriculum, differ from each other in terms of the profile memberships (e.g. Desimone, 2006; Spillane, 1998).

Methods

Participants

The participants comprised two cohorts: Cohort I: state-level stakeholders responsible for the development of the core curriculum, and Cohort II: district-level stakeholders involved in the construction of the local curricula.

Cohort I: the state-level stakeholders ($n = 116$) were accountable for constructing the national core curriculum in Finland as members of state-level working groups. The participants were comprised of school teachers ($n = 51$, 44 percent), university teachers

($n = 30$, 26 percent), association representatives ($n = 7$, 6 percent) and officials from the Finnish National Agency for Education and Ministry of Education and Culture ($n = 22$, 19 percent). The data were collected in 2014 while the working groups were finalizing the national core curriculum document. The majority of respondents were women ($n = 85$, 73 percent) and the minority men ($n = 29$, 25 percent). For 75 percent ($n = 87$) of the participants, this was the first time they had been involved in the core curriculum reform's state-level working groups. The mean age of the participants was 51.53 years ($SD = 7.82$; Min./Max. = 32/65).

Cohort II: the district-level stakeholders ($n = 550$) were responsible for the local curriculum development as members of district-level curriculum development working groups in 12 case districts in Finland. The municipal education providers were responsible for forming the working groups, and the process was similar in all the case districts; however, the case districts organized the local curriculum process in different ways, varying from collaboration among several neighboring municipalities to carrying out the reform work within an individual municipality. The participants were from 54 municipalities in Finland, representing 17 percent of all Finnish municipalities (54/320[1]), and included urban and rural municipalities of different size throughout Finland. Hence, the case districts represented different ways of organizing the local curriculum process as well as different types of municipalities in Finland. Most of the participants were teachers ($n = 403$, 73.3 percent), school leaders and principals ($n = 101$, 18.4 percent), and also included other school staff such as student counselors, and municipal administrators and coordinators ($n = 28$, 5.1 percent). The data were collected from the district-level working groups during the spring of 2016 when the local curricula were being finalized. As in the state-level group, the majority of respondents at the district level were women ($n = 408$, 74 percent) and the minority men ($n = 131$, 24 percent). At the district level, 61 percent ($n = 335$) of participants had previous experience in curriculum development work. The mean age of the participants was 46.03 years ($SD = 8.81$; Min./Max. = 26/71).

Measures

Both participant cohorts completed the Curriculum Reform Inventory (Pietarinen *et al.*, 2017; Sullanmaa *et al.*, submitted), including the same measures for curriculum coherence and school impact. The survey and measurements were developed for the research project (Pietarinen *et al.*, 2017), and the scales were initially pre-tested and commented on by two experienced stakeholders involved in the core curriculum process. The curriculum coherence scale (including 3 factors and 17 items) was designed to measure the perceived core curriculum coherence in terms of the core curriculum's goals, purpose, content and the development of teaching and learning (Pietarinen *et al.*, 2017). It includes three factors (Sullanmaa *et al.*, submitted): first, the consistency of the intended direction (CON, six items, $\alpha = 0.87$), that entails clarifying and supporting the roles and duties of the teacher and school as well as successfully summing-up the most important goals; second, the integrative approach to teaching and learning (INT, four items, $\alpha = 0.74$), that includes encouraging teachers to use activating teaching methods and assessment that supports learning, as well as supporting the harmonization of teaching; and third, the alignment between objectives, content and assessment (ALL, seven items, $\alpha = 0.84$), that includes continuity within subjects, acknowledging pupils' age range, as well as the alignment between goals, subjects, content, teaching methods and assessment.

The school impact scale (SCI, six items, $\alpha = 0.88$) measures the perceived impact of the curriculum reform process on further school-level development work (Pietarinen *et al.*, 2017). The scale used in this study was adapted from the scale developed by Pietarinen *et al.* (2017). It entails, for instance, maintaining active development work in schools, committing teachers to the development work and directing the development work to resolve problems observed in the daily life of the school. All items on the scales were rated on a seven-point

Likert scale ranging from 1 (fully disagree) to 7 (fully agree) (see the Appendix for scales and items). The percentage of missing values per item ranged from 0.8 to 3.6.

Measurement invariance between the two participant cohorts – state-level stakeholders ($n = 116$) and district-level stakeholders ($n = 550$) – was tested in terms of the curriculum coherence and school impact scales. The configural model and the models for metric and scalar invariance were compared by examining changes in CFI, TLI and RMSEA (Chen, 2007; Cheung and Rensvold, 2002; Wang and Wang, 2012). Full metric invariance was supported for the curriculum coherence and school impact scales across the two participant cohorts. Partial scalar invariance with two non-invariant intercepts in the curriculum coherence scale and two non-invariant intercepts in the school impact scale was also supported. The invariance of factor loadings and most of the intercepts was considered a sufficient basis for the further LPA (Byrne *et al.*, 1989; Cheung and Rensvold, 2002). The scores for each factor were obtained by calculating the mean of the factor indicators. The correlations and descriptive statistics for the mean scores of curriculum coherence and school impact for each participant cohort are shown in Table I.

The mean scores of the three components of curriculum coherence and school impact seemed to be slightly higher among the state-level stakeholders (Table I). In both participant cohorts, the integrative approach to teaching and learning was perceived as the highest, and consistency of the intended direction as the lowest, of the dimensions of core curriculum coherence. Among the state-level stakeholders, the minimum mean score value for the alignment between objectives content, and assessment was rather high compared to the other curriculum coherence components. Correlations between the curriculum coherence components and school impact were positive and high, as expected.

Analysis

A LPA was employed to detect subgroups of individuals based on their perceptions of the core curriculum and the reform process in terms of curriculum coherence and school impact. LPA is a person-centered approach focusing on the response patterns of individuals instead of relations among variables (Berlin *et al.*, 2014; Muthén and Muthén, 1998–2015). It is used

	CON	INT	ALI	SCI
<i>State-level stakeholders (n = 116)</i>				
Consistency of the intended direction (CON)				
Integrative approach to teaching and learning (INT)	0.73**			
Alignment between objectives, content and assessment (ALI)	0.69**	0.59**		
School impact (SCI)	0.72**	0.72**	0.59**	
Mean	5.04	5.45	5.32	5.04
SD	0.99	0.88	0.73	1.04
Min.	1.33	1.75	3.29	1.00
Max.	6.83	7.00	6.71	7.00
<i>District-level stakeholders (n = 550)</i>				
Consistency of the intended direction (CON)				
Integrative approach to teaching and learning (INT)	0.61**			
Alignment between objectives, content and assessment (ALI)	0.69**	0.66**		
School impact (SCI)	0.64**	0.62**	0.57**	
Mean	4.34	5.23	4.87	4.76
SD	1.00	0.86	0.80	0.96
Min.	1.17	1.75	2.00	1.33
Max.	6.83	7.00	7.00	7.00

Table I.
Correlations and descriptive statistics of curriculum coherence and school impact scales for each participant cohort

Note: ** $p < 0.01$

to identify unobserved subpopulations, i.e., latent classes of individuals based on their observed response patterns (Berlin *et al.*, 2014). More specifically, LPA was used in this study to explore the variation in the educational stakeholders' perceptions, and to examine whether the two participant cohorts differed in terms of their profile memberships.

The analyses were conducted using Mplus version 7.4 and MLR estimator, which produces maximum likelihood estimates with standard errors and χ^2 test statistics that are robust to non-normality (Muthén and Muthén, 1998–2015). The observed mean scores for the three components of curriculum coherence, and for the school impact scale, were used as the indicators of the latent profiles. The indicator variables were allowed to correlate within classes. An exploratory approach to obtain the best statistically and conceptually suitable latent class solution was used (Berlin *et al.*, 2014) and data were fitted to models estimating one through six classes (Table II). Akaike (AIC), Bayesian (BIC) and adjusted Bayesian (aBIC) information-based measures of fit, as well as Vuong–Lo–Mendell–Rubin (VLMR), Lo–Mendell–Rubin (aLRT) and bootstrapped (BLRT) likelihood ratio tests were used to determine the optimal number of classes (Berlin *et al.*, 2014; Nylund *et al.*, 2007). In addition, latent class probabilities and entropy statistics were used to examine the clarity of the different solutions. After identifying the most suitable latent profile solution, the three-step approach in Mplus (Asparouhov and Muthén, 2014) was used to investigate the differences between state- and district-level participants by adding the auxiliary variable, i.e., participant cohort, as a predictor of the latent class variable in logistic regression. The three-step approach considers the measurement error in the classification (Asparouhov and Muthén, 2014) and produces more reliable results than conducting comparisons using the most likely classifications as an observed variable.

Results

Latent profiles

Based on all fit indices and likelihood ratio tests, the two-class solution fit the data significantly better than the one-class model. According to the VLMR and aLRT likelihood ratio tests, the model fit did not significantly improve with the addition of any subsequent classes after the two-class model. The AIC and aBIC indices showed increasing fit with every additional class, whereas the BIC and the BLRT test showed the five-class model to fit the data best. However, the largest class, including 538–555 participants, remained relatively stable from two- to six-class solutions, and therefore the additional classes did not add substantive value. The two-class solution was thus considered the more parsimonious, and as the VLMR and aLRT likelihood ratio tests showed no further improvement in model fit with additional classes, the two-class model was chosen for further analysis. The entropy statistic of 0.76 in the two-class solution was considered adequate.

The profiles are shown in Figure 1. The first latent profile culled from the analysis was high coherence and impact. It was the most common profile among the participants in the entire data with an 83 percent share ($n = 555$). Participants in the high coherence and impact profile perceived the steering core curriculum document as coherent in terms of the three curriculum coherence components, and at the same time expected it to have a rather strong impact on school-level development.

The second latent profile lower consistency of intended direction and impact represented 17 percent of the participants ($n = 111$). The lower consistency of intended direction and impact profile holders showed less balanced perceptions of the core curriculum's coherence, with the consistency of the intended direction perceived as less evident in the core curriculum than the integrative approach to teaching and learning, and alignment between objectives, content and assessment. This was combined with slightly lower perceptions of the curriculum reform's impact on the school-level development work; however, the mean of the perceived school impact was still above the scale midpoint in this profile as well.

Table II.
The results of the latent profile analysis with 1–6 classes

No. classes	LogL (nf)	AIC	BIC	aBIC	Entropy	Latent class probabilities	VLMR	aLRT	BLRT	Class counts ^a
1	-2,834.49 (14)	5,696.98	5,760.00	5,715.55	na	1.000	na	na	na	666
2	-2,804.54 (19)	5,647.07	5,732.60	5,672.27	0.76	0.95, 0.86	0.00	0.00	0.00	555, 111 (573, 93)
3	-2,780.42 (24)	5,608.85	5,716.88	5,640.68	0.81	0.82, 0.89, 0.94	0.29	0.30	0.00	98, 31, 538 (84, 25, 557)
4	-2,763.60 (29)	5,585.20	5,715.74	5,623.66	0.85	0.76, 0.91, 0.94, 0.78	0.48	0.49	0.00	52, 27, 543, 43 (43, 23, 562, 38)
5	-2,747.26 (34)	5,562.52	5,715.57	5,607.61	0.87	0.80, 0.85, 0.94, 0.78, 0.95	0.13	0.14	0.00	47, 16, 10, 44, 549 (36, 13, 9, 39, 569)
6	-2,738.51 (39)	5,555.02	5,730.57	5,606.75	0.88	0.92, 0.76, 0.81, 0.92, 0.79, 0.94	0.15	0.15	0.08	6, 15, 38, 10, 55, 543 (5, 13, 29, 9, 43, 567)

Notes: LogL, log likelihood value; nf, number of free parameters; AIC, Akaike information criterion; BIC, Bayesian information criterion; aBIC, adjusted Bayesian information criterion; VLMR, Vuong–Lo–Mendell–Rubin likelihood ratio test; aLRT, Lo–Mendell–Rubin adjusted likelihood ratio test; BLRT, bootstrapped likelihood ratio test. The selected model is in *italic*; ^aclass counts based on estimated posterior probabilities and classification of individuals based on their most likely latent class membership (in parenthesis)

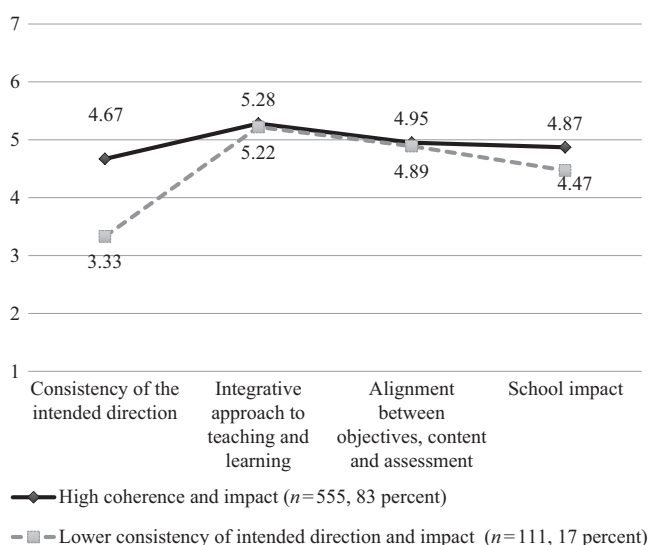


Figure 1. Profiles of perceived curriculum coherence and school impact among the state- and district-level stakeholders

The high coherence and impact profile holders perceived the consistency of the core curriculum's intended direction to be higher (Wald $\chi^2(1) = 80.08, p < 0.00$) and the reform's school impact stronger (Wald $\chi^2(1) = 5.04, p = 0.02$) compared to their counterparts in the lower consistency of intended direction and impact profile. The two profiles did not significantly differ from each other in terms of the perceived integrative approach to teaching and learning or alignment between objectives, content and assessment. Accordingly, both profile groups had shared and consensual perceptions of the two elements of curriculum coherence, i.e., an integrative approach to teaching and learning, and alignment between objectives, content and assessment. Hence, they had a similar understanding of the core curriculum's guiding role in reforming the practical aspects of the school-level teaching and learning, and in terms of the core curriculum constituting an aligned and continuous whole. However, the profiles differed from each other in the extent to which the core curriculum was estimated to successfully provide a consistent direction, for instance in summing-up the most important goals for schools and clarifying the roles of teachers and schools. In addition, the profiles differed slightly regarding the reform's perceived impact on school-level development, for instance in terms of how strongly the curriculum reform work supported the commitment to active development at the school level, and facilitated the solutions to school-level challenges.

Differences between state- and district-level stakeholders

The results of the logistic regression showed that the district-level stakeholders had 4.22 times greater odds of belonging to the lower consistency of intended direction and impact profile, compared to the state-level stakeholders ($b = 1.44, SE = 0.65, p = 0.03; OR = 4.22, 95\%CI = 1.18-15.10$). Conversely, the district-level stakeholders had 0.24 times the odds of belonging to the high coherence and impact profile relative to the state-level stakeholders ($b = -1.44, SE = 0.65, p = 0.03, OR = 0.24, 95\%CI = 0.07-0.85$). Hence, the state-level stakeholders displayed higher odds of falling into the high coherence and impact profile, and lower odds regarding the lower consistency of intended direction and impact profile relative to their district-level counterparts. Accordingly, the state-level stakeholders, responsible for constructing the core curriculum, were relatively more likely to perceive the

intended direction of the core curriculum as more consistent, and to evaluate the school-level impact more positively, than the district-level stakeholders. In contrast, the district-level stakeholders were relatively more likely to perceive the intended direction of the core curriculum as less consistent, and to evaluate the school impact as lower, compared to the state-level stakeholders. At the same time, both state- and district-level stakeholders estimated the curriculum coherence in terms of the integrative approach to teaching and learning, and alignment within the core curriculum, to be rather high. Moreover, it is important to note that the majority of participants in both cohorts belonged to the high coherence and impact profile. Still, the results imply that the state- and district-level stakeholders had some differences in their perceptions of both the consistency of the core curriculum's intended direction and the school impact of the curriculum reform.

Methodological reflection

The study was conducted in the context of the Finnish national curriculum reform and the participants were individuals invited to the curriculum reform work. Thus, they may have been more development oriented, open, or active, and hence could have had more positive perceptions about the reform than their peers who were not involved in the development work to the same extent. Further, engagement in the development work was likely to provide more opportunities for sense-making and building more coherent views about the curriculum document. Accordingly, they might have adopted more coherent perceptions of the reformed curriculum than on average. However, the participants in both the state- and district-level curriculum development working groups included a large percentage of teachers, school leaders and other school staff, some of whom had no previous experience in curriculum development work. Therefore, the sample represented a variety of roles in the educational system.

For the curriculum coherence and school impact scales, the metric and partial scalar measurement invariance across the two participant cohorts was supported. The few non-invariant intercepts might imply that some of the measurement items systematically evoked different response levels in the two participant cohorts (Cheung and Rensvold, 2002). In this study, the metric and partial scalar invariance was seen as providing a sufficient basis for the further analysis using observed mean scores. However, further validation of the scales with different samples is needed (also see Sullanmaa *et al.*, submitted). Moreover, the scales have not previously been validated in other countries or languages.

The selection of the latent profile solution was based on the likelihood ratio tests, fit indices and model parsimony. While the two-class solution was chosen, other fit indices in the LPA showed that the five-class solution would also have fit the data. With a larger sample, the smaller profiles could have been separated more clearly and might have provided additional information about the variation in the perceptions of the stakeholders.

Discussion

This study utilized a person-centered approach in exploring profiles of perceived curriculum coherence and school impact in the context of a national core curriculum reform in Finland. It also examined whether there were differences in profile memberships between the state- and district-level stakeholders involved in the curriculum reform. The results showed that 83 percent of the participants belonged to the high coherence and impact profile and 17 percent to the lower consistency of intended direction and impact profile. In addition, the differences between the state- and district-level stakeholders' odds of belonging to a certain profile were identified. The results showed that the state-level stakeholders had relatively higher odds of falling into the high coherence and impact profile, whereas the district-level stakeholders had relatively higher odds of belonging to the lower consistency of intended direction and impact profile. Earlier research has also shown that stakeholders and

practitioners at different levels as groups often hold different views about educational change (Desimone, 2006; Ng, 2009; Timperley and Parr, 2005; Yuen *et al.*, 2012).

The Finnish core curriculum is a central steering document for local school development, and its coherence influences the understanding of the shared object of the school development work at different levels of the educational system. The understanding of curriculum coherence was similar among the state- and district-level stakeholders in terms of the core curriculum's ability to provide an integrative approach to teaching and learning, and having alignment and continuity within the curriculum. This implies that the new core curriculum was perceived as effective in encouraging the use of integrative and activating teaching methods and aligning the content, teaching methods and assessment with the objectives. The agreement among the state- and district-level stakeholders on these core issues provides an important resource for further curriculum development work and implementation by establishing a common ground for the development work in the form of shared understanding.

However, the perceptions of the core curriculum providing a consistent direction for the schools' and teachers' work, and the reform work affecting the school-level development, varied among the state- and district-level stakeholders, with district-level stakeholders being more likely to perceive these aspects as less successful. A reason for this might be that the district-level stakeholders perceived the broader direction and intended effects on school-level development as less optimally explicated and clarified than the more practical aspect of the integrative approach to teaching and learning and alignment. On the other hand, the consistency of the intended direction as a component of curriculum coherence involves a broader, more abstract perspective on school development, for instance regarding how the curriculum supports the roles of schools and teachers in addition to facilitating the teaching of essential material. This may require the district-level stakeholders to process more fundamental, long-term objectives for the change, which might also require developing new competencies. The consistency of the curriculum's intended direction and the expected impact of the reform on the school-level development become operationalized and tested in the district-level curriculum work, where local conditions and school-level practice need to be considered and may sometimes collide with the reform aims (see McLaughlin, 1998; Spillane *et al.*, 2002).

Moreover, the state-level stakeholders' role in the reform process involved constructing the core curriculum. These stakeholders may therefore have acquired a broader perspective on the development work and greater experience of coherence through their role and activities in the working groups, and consequently may have viewed the core curriculum's intended direction and school-level effects of the reform more positively. A previous qualitative study has also shown that the Finnish state-level school administrators had a rather shared understanding of the reform's goals (Salonen-Hakomäki *et al.*, 2016). The district-level stakeholders' role, on the other hand, was to develop the local curriculum based on the general framework set by the reformed core curriculum. Accordingly, they played a different role and engaged in different activities in the curriculum development, making sense of the new core curriculum by comparing it with existing policies, analyzing the changes that needed to be implemented, and transforming the principles of the core curriculum into activities at the school level (Soini *et al.*, 2018).

Overall, the results showed that most of the participants at both the state and district level perceived the core curriculum as a rather coherent steering document and expected it to have a positive impact at the level of school development, for instance increasing teachers' commitment to the development work. Agreement about curriculum coherence and effects at the level of school development may further facilitate the curriculum implementation by supporting the local ownership of and commitment to the development work (see Cheung and Wong, 2011; Fullan, 2007; Ng, 2009). In turn, discrepancy or

contradictions in the interpretations among the stakeholders at different levels of the educational system may hinder the school-level implementation (Spillane *et al.*, 2002; Porter *et al.*, 2015). The results imply that more clarity, interaction, collaboration and shared coherence-making in the state- and district-level curriculum development work is needed in order to construct even more widely shared understandings, especially about the broader aspects of the intended direction of the core curriculum and the reform's effects on the school-level development work. This calls for shared sense-making between and within the state and district levels: negotiating the meaning of the curriculum for school development, its direction and its implications for teaching and learning. In addition to focusing on the coherence within the curriculum's content and elements, curriculum development work should pay more attention to promoting both individual and shared sense-making in the professional communities, focusing on building coherent understandings of the direction of the curriculum. Moreover, a clear and shared understanding about the potential effects and benefits of the reform work at schools should be one of the focal areas of the development work. However, further research is needed to investigate how much perceived coherence and agreement across levels of the educational system is necessary for the reform to have a positive impact on school-level development.

This study examined state- and district-level stakeholders' perceptions of the reformed Finnish core curriculum as a steering document guiding local school development, and the reform's expected impact on school-level development work. Although the difference between state- and district-level stakeholders' perceptions of curriculum coherence was expected, recent large-scale studies on the perceptions of different-level stakeholders focusing on perceived curriculum coherence are scarce. More research is needed to explore the socio-cultural determinants of coherence-making, for instance, the extent to which the coherence experienced differs in different contexts and whether similar or different patterns of perceived curriculum coherence and school impact can be found in other curriculum reform contexts.

It should be noted that at the time of the data collection, the implementation of the new curricula had not yet begun. Hence, the success and effectiveness of the new core curriculum will be further evident in the perceptions and understandings of teachers, in the changes in teaching and learning and in the sustainability of the change within the educational system. Further research is needed to gain a better understanding of how perceived curriculum coherence throughout the educational system contributes to curriculum reform implementation and coherence in school practice, for instance by examining teachers' perceptions of curriculum coherence as they develop and transform the curriculum at the school and classroom levels. Moreover, it would be useful to explore whether particular features of the Finnish curriculum reform process are related to the educational stakeholders' perceptions of curriculum coherence.

This study contributes to the literature on curriculum reform by shedding light on the perceptions of curriculum coherence and school impact of those involved in a large-scale national curriculum reform process; providing an understanding of the similarities and differences between the perceptions of state- and district-level stakeholders; utilizing a person-centered approach to examine variation in the stakeholders' perceptions; and suggesting that coherence-making within and between the levels of an educational system is important for facilitating successful curriculum reform.

Note

1. The municipalities were sampled on the basis of national statistics gathered by Statistics Finland (2013).

References

- Allen, C.D. and Penuel, W.R. (2015), "Studying teachers' sensemaking to investigate teachers' responses to professional development focused on new standards", *Journal of Teacher Education*, Vol. 66 No. 2, pp. 136-149.
- Asparouhov, T. and Muthén, B. (2014), "Auxiliary variables in mixture modeling: three-step approaches using Mplus", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 21 No. 3, pp. 329-341.
- Beane, J.A. (1995), *Toward a Coherent Curriculum*, ASCD, Alexandria, VA.
- Berlin, K.S., Williams, N.A. and Parra, G.R. (2014), "An introduction to latent variable mixture modeling (Part 1): overview and cross-sectional latent class and latent profile analyses", *Journal of Pediatric Psychology*, Vol. 39 No. 2, pp. 174-187.
- Bryk, A.S. (2010), "Organizing schools for improvement", *Phi Delta Kappan*, Vol. 91 No. 7, pp. 23-30.
- Buchmann, M. and Floden, R.E. (1992), "Coherence, the rebel angel", *Educational Researcher*, Vol. 21 No. 9, pp. 4-9.
- Byrne, B.M., Shavelson, R.J. and Muthén, B. (1989), "Testing for the equivalence of factor covariance and mean structures: the issue of partial measurement invariance", *Psychological Bulletin*, Vol. 105 No. 3, pp. 456-466.
- Cantlon, D., Rushcamp, S. and Freeman, D. (1990), "The interplay between state and district guidelines for curriculum reform in elementary schools", *Journal of Education Policy*, Vol. 5 No. 5, pp. 63-80.
- Chen, F.F. (2007), "Sensitivity of goodness of fit indexes to lack of measurement invariance", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 14 No. 3, pp. 464-504.
- Cheung, A.C.K. and Wong, P.M. (2011), "Effects of school heads' and teachers' agreement with the curriculum reform on curriculum development progress and student learning in Hong Kong", *The International Journal of Educational Management*, Vol. 25 No. 5, pp. 453-473.
- Cheung, G.W. and Rensvold, R.B. (2002), "Evaluating goodness-of-fit indexes for testing measurement invariance", *Structural Equation Modeling*, Vol. 9 No. 2, pp. 233-255.
- Coburn, C.E. (2003), "Rethinking scale: moving beyond numbers to deep and lasting change", *Educational Researcher*, Vol. 32 No. 6, pp. 3-12.
- Coburn, C.E. (2005), "Shaping teacher sensemaking: school leaders and the enactment of reading policy", *Educational Policy*, Vol. 19 No. 3, pp. 476-509.
- Darling-Hammond, L. (1998), "Policy and change: getting beyond bureaucracy", in Hargreaves, A., Lieberman, A., Fullan, M. and Hopkins, D. (Eds), *International Handbook of Educational Change*, Kluwer Academic, Dordrecht, pp. 642-667.
- Desimone, L. (2006), "Consider the source response differences among teachers, principals, and districts on survey questions about their education policy environment", *Educational Policy*, Vol. 20 No. 4, pp. 640-676.
- Dutro, E., Fisk, M.C., Koch, R., Roop, L.J. and Wixson, K. (2002), "When state policies meet local district contexts: standards-based professional development as a means to individual agency and collective ownership", *Teachers College Record*, Vol. 104 No. 4, pp. 787-811.
- Elmore, R. (1996), "Getting to scale with good educational practice", *Harvard Educational Review*, Vol. 66 No. 1, pp. 1-27.
- Fernandez, T., Ritchie, G. and Barker, M. (2008), "A sociocultural analysis of mandated curriculum change: the implementation of a new senior physics curriculum in New Zealand schools", *Journal of Curriculum Studies*, Vol. 40 No. 2, pp. 187-213.
- Finnish National Board of Education (2014), "National core curriculum for basic education 2014", Publications No. 2016:5, Finnish National Board of Education, Helsinki.
- Fortus, D., Sutherland Adams, L.M., Krajcik, J. and Reiser, B. (2015), "Assessing the role of curriculum coherence in student learning about energy", *Journal of Research in Science Teaching*, Vol. 52 No. 10, pp. 1408-1425.

- Fullan, M. (2007), *The New Meaning of Educational Change*, 4th ed., Teachers College Press, New York, NY.
- Fullan, M. (2009), "Large-scale reform comes of age", *Journal of Educational Change*, Vol. 10 Nos 2-3, pp. 101-113.
- Hallinger, P. and Heck, R.H. (2002), "What do you call people with visions? The role of vision, mission, and goals in school leadership and improvement", in Leithwood, K. and Hallinger, P. (Eds), *Handbook of Research in Educational Leadership and Administration*, 2nd ed., Kluwer Academic, Dordrecht, pp. 9-40.
- Honig, M.I. and Hatch, T.C. (2004), "Crafting coherence: how schools strategically manage multiple, external demands", *Educational Researcher*, Vol. 33 No. 8, pp. 16-30.
- Kelly, A.V. (2009), *The Curriculum: Theory and Practice*, 6th ed., Sage, Los Angeles, CA.
- Louis, K.S. and Robinson, V.M. (2012), "External mandates and instructional leadership: school leaders as mediating agents", *Journal of Educational Administration*, Vol. 50 No. 5, pp. 629-665.
- McLaughlin, M. (1998), "Listening and learning from the field: tales of policy implementation and situated practice", in Hargreaves, A., Lieberman, A., Fullan, M. and Hopkins, D. (Eds), *International Handbook of Educational Change*, Kluwer Academic, Dordrecht, pp. 70-84.
- Muthén, L. and Muthén, B.O. (1998–2015), *Mplus Users Guide*, 7th ed., Muthén & Muthén, Los Angeles, CA.
- Newmann, F.M., Smith, B., Allensworth, E. and Bryk, A.S. (2001), "Instructional program coherence: what it is and why should it guide school improvement policy", *Educational Evaluation and Policy Analysis*, Vol. 23 No. 4, pp. 297-321.
- Ng, S.W. (2009), "Why did principals and teachers respond differently to curriculum reform?", *Teacher Development*, Vol. 13 No. 3, pp. 187-203.
- Nordholm, D. (2016), "State policy directives and middle-tier translation in a Swedish example", *Journal of Educational Administration*, Vol. 54 No. 4, pp. 393-408.
- Nylund, K.L., Asparouhov, T. and Muthén, B.O. (2007), "Deciding on the number of classes in latent class analysis and growth mixture modeling: a Monte Carlo simulation study", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 14 No. 4, pp. 535-569.
- Ornstein, A.C. and Hunkins, F.P. (2004), *Curriculum: Foundations, Principles, and Issues*, 4th ed., Allyn & Bacon, Boston, MA.
- Pietarinen, J., Pyhältö, K. and Soini, T. (2017), "Large-scale curriculum reform in Finland – exploring the interrelation between implementation strategy, the function of the reform, and curriculum coherence", *The Curriculum Journal*, Vol. 28 No. 1, pp. 22-40.
- Porter, R.E., Fusarelli, L.D. and Fusarelli, B.C. (2015), "Implementing the common core: how educators interpret curriculum reform", *Educational Policy*, Vol. 29 No. 1, pp. 111-139.
- Reezigt, G.J. and Creemers, B.P.M. (2005), "A comprehensive framework for effective school improvement", *School Effectiveness and School Improvement*, Vol. 16 No. 4, pp. 407-424.
- Russell, J.L. and Bray, L.E. (2013), "Crafting coherence from complex policy messages: educators' perceptions of special education and standards-based accountability policies", *Education Policy Analysis Archives*, Vol. 21 No. 12, available at: <http://epaa.asu.edu/ojs/article/view/1044> (accessed March 1, 2019).
- Sahlberg, P. (2015), *Finnish Lessons 2.0: What Can the World Learn from Educational Change in Finland?*, 2nd ed., Teachers College Press, New York, NY.
- Salonen-Hakomäki, S., Soini, T., Pietarinen, J. and Pyhältö, K. (2016), "The way ahead for Finnish comprehensive school? Examining state-level school administrators' theory of change", *Journal of Curriculum Studies*, Vol. 48 No. 5, pp. 671-691.
- Schmidt, W.H., Wang, H.C. and McKnight, C.C. (2005), "Curriculum coherence: an examination of US mathematics and science content standards from an international perspective", *Journal of Curriculum Studies*, Vol. 37 No. 5, pp. 525-559.
- Shwartz, Y., Weizman, A., Fortus, D., Krajcik, J. and Reiser, B. (2008), "The IQWST experience: using coherence as a design principle for a middle school science curriculum", *The Elementary School Journal*, Vol. 109 No. 2, pp. 199-219.

- Smith, J.B., Smith, B. and Bryk, A.S. (1998), *Setting the Pace: Opportunities to Learn in Chicago's Elementary Schools*, Consortium on Chicago School Research, Chicago, IL.
- Soini, T., Pietarinen, J. and Pyhältö, K. (2018), "Shared sense-making strategies in curriculum reform: district-level perspective", *Improving Schools*, Vol. 21 No. 2, pp. 111-126.
- Spillane, J.P. (1998), "State policy and the non-monolithic nature of the local school district: organizational and professional considerations", *American Educational Research Journal*, Vol. 35 No. 1, pp. 33-63.
- Spillane, J.P. (2004), *Standards Deviation: How Schools Misunderstand Education Policy*, Harvard University Press, Cambridge, MA.
- Spillane, J.P. and Callahan, K.A. (2000), "Implementing state standards for science education: what district policy makers make of the hoopla", *Journal of Research in Science Teaching*, Vol. 37 No. 5, pp. 401-425.
- 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.
- Squires, D.A. (2009), *Curriculum Alignment: Research-Based Strategies for Increasing Student Achievement*, Corwin Press, Thousand Oaks, CA.
- Squires, D.A. (2012), "Curriculum alignment research suggests that alignment can improve student achievement", *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, Vol. 85 No. 4, pp. 129-135.
- Statistics Finland (2013), *Municipalities and Regional Divisions Based on Municipalities*, Vol. 28, Statistics Finland, Helsinki.
- Sullanmaa, J., Pyhältö, K., Pietarinen, J. and Soini, T. (forthcoming), "Curriculum coherence as perceived by district-level stakeholders in large-scale national curriculum reform in Finland", *The Curriculum Journal*.
- Tikkanen, L., Pyhältö, K., Soini, T. and Pietarinen, J. (2017), "Primary determinants of a large-scale curriculum reform: national board administrators' perspectives", *Journal of Educational Administration*, Vol. 55 No. 6, pp. 702-716.
- Timperley, H. and Parr, J. (2005), "Theory competition and the process of change", *Journal of Educational Change*, Vol. 6 No. 3, pp. 227-251.
- Vitikka, E., Krokfors, L. and Hurmerinta, E. (2012), "The Finnish national core curriculum", in Niemi, H., Toom, A. and Kallioniemi, A. (Eds), *Miracle of Education: The Principles and Practices of Teaching and Learning in Finnish Schools*, Sense Publishers, Rotterdam, pp. 83-96.
- Wang, J. and Wang, X. (2012), *Structural Equation Modeling: Applications using Mplus*, Wiley, Chichester.
- Yuen, T.W.W., Cheung, A.C.K. and Wong, P. (2012), "A study of the impact of the first phase of the curriculum reform on student learning in Hong Kong", *International Journal of Educational Management*, Vol. 26 No. 7, pp. 710-728.

Appendix. The scales and items for curriculum coherence and school impact

Scales*

Curriculum coherence

Consistency of the intended direction

(In) the national core curriculum [...]

Con11: clarifies the entity of a teacher's job

Con12: supports the teaching of the essential material in various subjects

Con13: delimits the duty of the school in a sensible manner

Con14: is clear and well organized

Con15: successfully sums up the most important goals for the operation of the school

Con16: constitutes an aligned foundation for the local curricular work

Integrative approach to teaching and learning

(In) the national core curriculum [...]

Int21: encourages teachers to use activating and engaging teaching methods

Int22: encourages teachers to use assessment methods that support learning

Int23: supports the harmonization of teaching

Int24: the general section creates something new

Alignment between objectives, content and assessments

(In) the national core curriculum [...]

Ali31: the goals are in line with the assessment criteria

Ali32: a subject constitutes an integral continuum

Ali33: the goals are in line with contents

Ali34: takes a pupil's age range into consideration

Ali35: descriptions of teaching methods in various subjects are in harmony with the general goals

Ali36: constitutes an integral whole

Ali37: the goals of the general section are also well in evidence in the subject section

School impact

The work to reform the curriculum [...]

Sci1: maintains active development work at schools

Sci2: commits teachers to working on developing the school

Sci3: helps the school community identify the core tasks

Sci4: directs development work to resolve problems observed in the daily life of the school

Sci5: helps people develop solutions that work at the local level for organizing teaching

Sci6: promotes the resolution of many problems related to basic education at the local level

*Translated from Finnish.

Corresponding author

Jenni Sullanmaa can be contacted at: jenni.sullanmaa@helsinki.fi