

Leading the Development of Research-based Teaching: A Swedish Case

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ABSTRACT

The aim of this article is to examine Swedish principals' conception of their leadership role when realising research-based teaching in relation to research traditions. The study is based on ten principals' conceptions of research-based teaching, analysed phenomenographically. The results indicate that application of research results is in several respects the most dominant notion of what teaching on a scientific basis entails. The conceptions of the principals' derive from traditionally accepted beliefs and expectations, which is in line with how national reforms are implemented. Instructional and transformational leadership models are represented when leading schools toward research-based teaching.

Keywords: *research-based teaching, principals' experiences, pedagogical leadership, primary schools (K-9)*

Introduction

Today, there seems to be a broad consensus that education should be research-based and a wave of research-based policies and practices have been prioritised in many school systems in recent decades (Forsberg & Sundberg, 2019; Levin, 2013). The idea of research in practice rests on an assumption that scientific research can positively affect schools' performance (Brørup Dyssegaard et al., 2017; Levinsson, 2013; Nordin, 2014; OECD, 2015). It thus seems logical that teaching should primarily be research-based, but questions about the role of research in practice and the type of research in demand are less frequently discussed. There are also different conceptions of what is meant by research-based teaching. It is possible to identify two recurring lines of

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argumentation in the debate about schools' opportunities to base their activities on research (Carlgren, 2010). These two lines of argumentation are sometimes described as the difference between a) research *about* and research *on*, and b) research *for* (and *with*) teachers (Bulterman Bos, 2008; Carlgren, 2010; Runesson, 2011). Those who represent the first line argue that relevant research produced by researchers at universities is available, but there are insufficient structures and methods to ensure reliable implementation of the results in schools (Slavin, 2008).

Those representing the second line argue that research for realising teaching on a scientific basis should to a greater extent be based on involving teachers in research on their own practice (Carr & Kemmis, 1986; Elliott, 2001). According to this line of argument, university-based research is considered to a great extent insufficient, because rather than developing knowledge suited for use by teachers, it has mainly created more knowledge *about* teachers and teaching.

The issue of research-based education has played a special role in a Swedish educational context where it has been enshrined in the Education Act since 2010 (Education Act, 2010). The term "scientific basis" is defined by The Swedish National Agency for Education as critically examining, evaluating, and putting specific factual knowledge in context and searching for explanations and causal connections in relevant research (Swedish National Agency for Education, 2020). When it comes to realising research-based teaching to produce better teaching and outcomes for pupils, principals are important actors, as they are expected to lead this developmental work (SFS 2010:800, kap. 2 paragraf 9). This was emphasised in the revised curriculum from 2018, in which the principal was given a new responsibility to continuously give teachers opportunities to share their knowledge and learn from each other (Swedish Schools Inspectorate, 2019). The requirements, expressed in the Swedish Educational Act, have created new challenges and expectations for principals, who have the responsibility to realise research-based teaching in their schools. There is however not much knowledge about the ways in which principals understand or experience such demands.

Aim

The aim of this article is to examine and discuss Swedish principals' conception of their leadership role when realising research-based teaching in relation to the two lines of argumentation.

What possible consequences can different conceptions of research-based teaching have for the role of the principal as a leader of development?

Background and research review

Based on these two lines of argumentation, or the two research traditions, teachers can learn and develop teaching, *from*, *about* and *through* research (Hodson, 1992). Learning *from* research means that teachers acquire knowledge of theories and research in their field. Learning *about* research means that teachers gain knowledge

of methods, while learning *through* research means that teachers acquire knowledge of their discipline by doing research themselves (Dekker & Walsarie, 2016). Labaree (2003) reports that researchers in education traditionally engage in the collection of data and the rational analysis of that data. This results in explicit knowledge that can be disseminated through conferences, articles, and books. This knowledge is analytical, intellectual, universal, and theoretical (Bulterman-Bos, 2017). The ability to implement research and develop teaching on a scientific basis, requires knowledge *from* and *about* research. However, there are obstacles associated with this, such as interpreting whether international research can be applied to different national school practices, the significance of context, and whether international research differs depending on the research objects (Håkansson & Sundberg, 2012). Methodological limitations must also be considered (Bennett, 2016), as well as how research questions are formulated. Teachers find it challenging to locate relevant research from the large number of studies available (Håkansson & Sundberg, 2012; Levinsson, 2013; Swedish Schools Inspectorate, 2019). Further, research relevant to teaching often needs translation into practice to become more accessible for teachers (Hultman, 2015). Opportunities to use, discuss and reflect on the results of a specific practice are also very beneficial (Darling-Hammond, 2010).

In addition to research being used by teachers for the development of teaching, research can also be used to support and emphasise argumentation, such as in cases where different educational ideals vie for dominance. If the purpose is to support special interests, results can be used to demonstrate educational ideas, concepts, and methods (Håkansson & Sundberg, 2016).

In practice-based research, by way of their participation teachers develop knowledge *through* research. The tradition of involving teachers in developmental research can be traced back to John Dewey at the beginning of the 20th century, with his idea of involving teachers in research on their own practice. Another tradition drawing from Dewey's work, is action research with roots in Kurt Levin's work. Later, during the 1970s and 1980s, the so-called *teacher as researcher movement* was introduced (Cochran-Smith & Lytle, 1999). Today, this type of research has different names and interpretations such as *practice developmental research*, which is often used as an umbrella term and is built on the idea that the research problem needs to be defined within the practice and that teachers constitute an integral part of the research (Bulterman-Bos, 2008; Carlgren, 2012). Examples of practice developmental research are action research (Elliot, 1991; Rönnerman, 2018), design experiment (Brown, 1992; Collins, 1992), lesson studies (Lewis, et. al., 2006; Lewis & Hurd, 2011), development research (van der Akker, 1999) and learning studies (Marton & Lo, 2007; Pang & Ling, 2012).

Practice-based research presupposes that researchers and teachers work collaboratively. Researchers contribute their theories and analytical methods, and teachers contribute their experience (Carlgren, 2012; Eriksson, 2018). The problem is identified by the teacher and transformed in collaboration with the researcher into a

research question. Teachers participation is seen as significant as they are considered best suited to determine which issues and problems are important (Runesson, 2011) according to the profession's needs (Cochran-Smith & Lytle, 1999; Eriksson, 2018; Zeichner & Noffke, 2001). The work is often interventionist and iterative, which means that researchers and teachers work together to produce research lessons that are planned, analysed, and developed. They do not study ongoing practice but try specific theory-based teaching designs. Such lessons are developed and improved iteratively, through processes in which theory and practice influence each other over the course of a number of lessons (Bulterman-Bos, 2008; Carlgren, 2011). Eriksson (2018) suggests that when teachers contribute to a study's analysis, this increases the quality of results and conclusions (see also Bulterman-Bos, 2008).

Some critical voices such as Eriksson (2018) have identified problems in the way research was conducted. She argues for the importance of principals being involved to collectively legitimise this kind of work. Teachers need time throughout the project to be able to participate in problem identification and project planning. In collaborative projects, problems can arise if the teachers and researchers do not have a shared knowledge interest. A collaborative approach requires teachers and researchers to devise ways of handling the tension that arises when the researchers appear more knowledgeable than the teachers. It becomes problematic if teachers believe they are participating in a course and find themselves in the role of a student, while the researcher falls into the role of a teacher. Further, ethical issues arise, related to the ownership of both data and results, such as who should be credited as the author (Eriksson, 2018).

These two research traditions can be linked with regard to school development strategies. The first strategy links to the implementation of national reforms that drive school development. Under this strategy, principals and teachers are regarded as research consumers and implementers. The second strategy advocates teacher-owned, continuous development work, where school development is driven from below and based on collective discussion and teachers' experiential knowledge (Stigler & Hiebert, 1999). Sweden, like most Western countries, has been dominated by a reform strategy stipulating that school development is to take place through implementation of centrally developed reforms, based on an underlying perception that, if teaching is to be improved and become more research-based, principals and teachers have to use existing research and therefore be educated as research consumers (Carlgren, 2010, 2011). To provide principals and teachers with reliable conditions for planning, implementation, and evaluation of the teaching process, Sweden, like many other countries, founded institutions for mapping and synthesising research-based knowledge within the field of education. As one such service, the Swedish Institute for Educational Research was established in 2015.

During the 21st century, Swedish schools underwent extensive decentralisation reforms that affected principals' roles and duties. As a result, they now have more tasks related to economics and administration (Jarl, 2013). In 2014, Swedish primary school (K-9) principals spent more time on administrative tasks (51%) than

on educational tasks (19%), which means that Sweden had the highest proportion of administrative tasks compared to all other participating OECD countries (OECD, 2014, 2015). The Swedish Schools Inspectorate (2017) criticised the principals' way of leading education and the way they analysed and developed their own work, for example school quality work.

The eligibility requirements for principals also changed. Before 2011, principals were expected to have a teaching qualification and were considered the most prominent teacher in the school (Swedish Government Official Reports, 2015). Today, the principal's role has evolved into a specific profession. A teaching qualification is no longer a formal requirement, which means principals can be recruited from other professions. To become a principal, educational knowledge and a specialised principal's education from a university (30 ECTS) are required (Swedish National Agency for Education, 2012).

Brørup Dyssegaard et al. (2017) conducted a systematic review of the international empirical research on what enables or hinders the use of research-based knowledge in primary and lower secondary schools. Their results clearly demonstrate the importance of principals and school management teams in the implementation of programmes and activities. They identify some important points, which they summarise as follows:

School leaders and school management teams should: Lead the way. Demonstrate committed and continuous support. Show flexibility and give personal support. Have knowledge about curriculum, instruction, and assessment processes. Help staff in their daily practice. Give administrative support to the teachers. Show trust and shared responsibility in the management teams. Support team members in promoting implementation processes. Show realistic expectations. (Brørup Dyssegaard et al., 2017, pp. 46–47)

Studies of how Swedish principals relate to research traditions when leading a school towards research-based teaching are rare, and the present study aims to help fill this gap. An example of previous research on this topic is a Swedish study of how principals perceived the concept of scientific basis, in which 40 principals from preschools, primary schools and upper secondary schools answered a questionnaire. The concept was described in general terms, such as: research forms the basis and support for what is carried out in teaching. The most common results show that the principals read and stayed updated about research results and discussed them with their teachers. The results also show that there was a shortage of research results on analytical and critical approaches and that it was unusual that research results were valued and related to the teachers' own activities (Hörnqvist, 2014, 2019).

Pedagogical leadership

Several studies report a correlation between a principal's ability to lead school development and successful schools (Brørup Dyssegaard et al., 2017; Hattie & Timperley,

2007; Robinson, et al., 2008; Törnsén, 2009; Uljens et al., 2016). Usually, this is associated with *pedagogical leadership*. However, there is no consistent definition of what pedagogical leadership means (Törnsén & Ärlestig, 2014; Ståhlkrantz, 2019). The definition of pedagogical leadership used in this study is influenced by Nestor (1993): The influence that principals exert in relation to teachers through various actions aimed to encourage teachers to develop teaching methods in accordance with the goals and guidelines set out in the curriculum and school law.

An expanded understanding of pedagogical leadership can be linked to school development (Leo, 2015). Pedagogical leadership can, then, be understood as a combination of instructional and transformational leadership (Törnsén, 2009). Instructional leadership and transformational leadership have been the two predominant conceptual models studied in pedagogical leadership over the past 25 years (Hallinger & Heck, 1996). These two models focus explicitly on the manner in which the pedagogical leadership exercised by principals and teachers brings about improved educational outcomes (Hallinger, 2003).

Instructional leadership

Hallinger (2003) describes three dimensions that characterise instructional leadership: defining the school's mission, managing the instructional programme, and promoting a positive school learning climate. Below, these dimensions are further delineated into instructional leadership functions.

Defining the school's mission. The principal's responsibility is to ensure that the school has clear and measurable goals that are focused on the academic progress of its students and that the goals are widely supported throughout the school community. This dimension does not assume that the principal alone defines the school's goals; what matters is designing the goals and communicating them to the teachers.

Managing the instructional programme focuses on coordinating and controlling the instruction and curriculum. This requires leaders to be deeply engaged in their schools' instructional development. This dimension incorporates three leadership functions: supervising and evaluating instruction, coordinating the curriculum, and monitoring student progress.

Promoting a positive school learning climate includes several functions: protecting instructional time, promoting professional development, maintaining high visibility, providing incentives for teachers, and providing incentives for learning.

Hallinger's conclusions include the need for principals to contribute to schools' efficiency and students' progress through their leadership and by influencing teachers and what happens in the school and the classroom. However, instructional leadership may not be the only leadership role a principal has, and instructional leaders must adjust their performance to the needs, opportunities and constraints imposed by the school context (Hallinger, 2003).

Transformational Leadership

Transformational leadership can be divided into three broad categories that have been named differently by different researchers, but which have a similar meaning. Within each category, there are a large number of competencies, orientations, and considerations that principals use in their leadership (Leithwood & Jantzi, 2006). According to Leithwood and Jantzi (2006). The categories included in the model are:

Setting Directions. This refers to the dimensions that constitute the school vision, develop specific goals and priorities, and uphold high performance expectations. A critical aspect is how the principal manages to develop a common understanding of the goals and activities that give teachers a sense that it is meaningful to work in that direction.

Developing People is the dimension that provides intellectual stimulation, offers individualised support, and models desirable professional practices and values. The extent to which teachers have the ability to engage is partly due to the principal's knowledge of what is required to improve the quality of teaching and learning.

Redesigning the Organisation includes developing a collaborative school culture, creating structures to foster participation in school decisions, and creating productive community relationships.

The model does not assume that the principal alone will provide the leadership that creates these conditions and is based on an understanding of the unique needs of each teacher, rather than guiding them as a group towards the organisation's ultimate goals (Hörnqvist, 2019).

Leadership models' similarities and differences

Hallinger (2003) identifies conceptual similarities and differences between instructional and transformational leadership but argues there are more similarities than differences between them. Both models share a strong focus on creating a shared sense of purpose in the school, developing a climate of high expectations, the improvement of teaching and learning, shaping the reward structure of the school to reflect the goals set for teachers and students, organising and providing a wide range of activities to intellectually stimulate and develop teachers to be a visible presence in the school, and modelling the values that are important in the school (Hallinger, 2003, p. 343). The conceptual differences Hallinger identifies are:

Top-down vs. bottom-up focus in approach to school improvement. Instructional leadership has been characterised as a top-down approach to school leadership, while transformational leadership is often considered a type of shared or distributed leadership.

First-order or second-order target for change. Instructional leadership works to influence the conditions that have a direct impact on what is taught in the classroom and how it is taught, while transformational leadership aims to increase the abilities of teachers to improve students' learning.

Managerial or transactional vs. transformational relationship to staff. Instructional leaders try to guide and steer teachers towards defined goals, while transformational leaders build teachers' ability to participate in the work towards goal fulfilment (Hallinger, 2003).

Method and data collection

This article is based on a phenomenographic interview study conducted in the spring of 2016 with ten municipal primary school (K-9) principals in the Stockholm area, in Sweden (Ståhle & Eriksson, 2018). The principals comprised six women and four men, all with a teaching degree (one with a postgraduate degree), and with 5-21 years of experience in school leadership. The primary schools, situated in six municipal school districts, varied in size from 350-1170 pupils and the proportion of pupils who had achieved the knowledge requirements in all subjects in grade nine varied from 36%-98%. It was probable that qualitatively different conceptions could be expressed in this sample, and our aim was to find them. All the schools had regular collaborations with universities through programmes such as teacher education and work placement.

Data in phenomenographic studies are usually collected through individual, semi-structured interviews. In the study used for this article, the interviews, collected by the author, covered the following areas: pedagogical leadership, the teaching profession, the principals' profession, educational development, and research-based teaching. The interviews lasted between 56-85 minutes and the transcribed interviews comprised 1559 pages. The role of the interviewer was to ask clarifying and developmental questions in relation to the respondents' stories.

Data analysis

The interviews were analysed phenomenographically (Marton, 1981, 2015) and concerned how the principals conceptualised the phenomenon of leading research-based teaching. Phenomenography is a research approach that describes qualitatively different ways of perceiving or experiencing phenomena, and it draws on the epistemological idea that humans experience a phenomenon in qualitatively different ways. On the one hand, humans experience a phenomenon in a specific way, and, on the other hand, one person can experience the same phenomenon in qualitatively different ways, depending on the experiences to which that person relates. This means that a single person will not necessarily have only one way of experiencing a phenomenon. Marton (1981) postulates that a phenomenon can only be understood as we experience or conceptualise it, a worldview according to which it is impossible to separate the one who is describing the world from the world being described. Our experiences as humans, therefore, depend on the practices of which we are a part. Consequently humans can only develop a limited number of experiences of a certain phenomenon, which can be described through a limited number of categories. Outcomes are represented analytically as a number of qualitatively different meanings or ways of experiencing the phenomenon called "categories of description" (Marton, 1981, 2015). The variety of

conceptions, or ways of experiencing a phenomenon, are described through a number of qualitatively different categories. Together, those categories comprise what Marton (1981, 2015) calls an “outcome space”.

During the analysis, the transcripts were pooled into one dataset. Individual responses were not sought, and the final categories do not represent any individual respondent (Ståhle & Eriksson, 2018). The analysis of the interviews consisted of a coded reliability check, where two researchers independently read and coded the transcripts and compared categorisations. Then a dialogic reliability check was conducted, whereby the researchers arrived at a consensus through discussion and critique of the data and each researcher’s interpretive hypotheses (Åkerlind, 2012).

Varying conceptions

The analysis resulted in three qualitatively different ways of experiencing the phenomenon: a) use of current research, b) following the curriculum, and c) reliance on teachers’ knowledge. A detailed description of these categories is reported in Ståhle & Eriksson (2018), a Swedish publication.

a) Use of current research

The category *use of current research* shows the principals perceived the curriculum as scientifically based and that it provided a framework for how teaching should be conducted. The curriculum had to be followed, so there was no room for other content or teaching methods.

If you follow the curriculum and do what is written there, then the teaching is based on a scientific foundation. (Principal 1)

This category includes statements about how research results were used or expected to be used to implement research-based teaching and pertains to how relevant research could be identified and implemented in teaching. The principals expressed a problem-oriented attitude. They thought that teaching development should be research-based but considered the question of how to interpret research findings and what kind of research findings to choose to be problematic. The issue of whether teaching should be continuously influenced by new research findings or governed in the long term, was key.

If a research team succeeds in developing new methods for language learning, then everyone should change very quickly. Then, when a new researcher comes and develops something else three years later, one should change again. (Principal 7)

This quote reveals an uncritical attitude to the “modern” research done by internationally known researchers such as Paul Black, John Hattie, Helen Timperley and Dylan Wiliam. The principals referred to them as an important source of research-based knowledge.

Leading the Development of Research-based Teaching: A Swedish Case

William is very well known. Yes, it was something we found and it matched quite well with what we needed, because it's like a package that you can follow and includes questions. (Principal 9)

What does Timperly say now, or Hattie – which guru is relevant now? (Principal 3)

The principals stated that when teachers read scientific literature and research, the latter should not be too extensive or difficult to read. They thought the research reviews published on The Swedish National Agency for Education's website were optimal. Research was perceived as a tool to be used in practice.

As there is a lot of research available, it is hard to select. You have to update yourself. I look at the National Agency for Education, and I try to read different literature. But it is difficult. There is always new, interesting research available. (Principal 5)

This category also includes statements indicating that the school sometimes had to convince parents that their work was based on research. Some principals use research to support arguments for a certain pedagogy that the school should follow and detailed strategies for how research results could form the basis for teaching development.

Researchers from universities were seen by the principals as useful in school development because they provided scientific expertise in areas where teachers' skills were insufficient. The principals had confidence in research results and researchers' knowledge, and they expected researchers to be able to provide answers to various problems. Therefore, disappointment arose when researchers did not fulfil this expectation.

In sum, the conception described in this category reflects the principals' focus on the interpretation and implementations of results (either as a policy instrument or guideline) and their belief that researchers as experts could be used as a resource to bring scientific skills into schools. The category also shows that it is possible to use research to support argumentation in situations where different educational ideals vie for dominance.

b) Following the national curriculum

The second category, *following the national curriculum*, includes statements indicating that the principals perceived the national curriculum and its syllabi to be scientifically based. They believed that if the teachers followed the curriculum, the teaching would be scientifically based. The curriculum was perceived as providing a framework for how teaching should be conducted and the knowledge pupils were expected to acquire. There was no room for other knowledge content or teaching methods.

If you follow the curriculum and do the things you are supposed to do, teaching will be based on science. (Principal 1)

This category includes statements indicating that the curriculum contains subject matter designed to teach scientific abilities that pupils must develop, such as analytical and critical thinking.

In sum, this category shows that the principals perceived the curriculum as an authoritative text based on science that controlled the knowledge content and contained goals aimed at developing pupils' scientific approach.

c) Reliance on the teachers' scientific knowledge

The third category, *reliance on the teachers' scientific knowledge*, was perceived by the principals as necessary for realising research-based teaching. The teachers were expected to be interested in research and to allocate time for study and reflection. Skilled teachers based their didactic choices on research literature and findings. They were expected to use new research in different teaching situations and reflect on the outcomes. They were also expected to highlight issues from different perspectives to give pupils the opportunity to learn to think critically and draw their own conclusions.

Teacher training was perceived as a guarantee for research-based teaching. The students were expected to be scientifically educated and learn from and about research. They were expected to know how to search for relevant research in their discipline and be familiar with research methods. One problem was that many teachers did not have the required training.

Then I thought, it is going to take a long time to implement. There is a generation of teachers who must retire first. Teachers' education and professional training are different today and include higher academic training and a master's thesis. (Principal 2)

In sum, this category reflects the principals' belief that teachers' scientific knowledge and interest were necessary for realising research-based teaching and that teacher training was a prerequisite for ensuring the emergence of research-based teaching.

Discussion

The qualitatively different conceptions or ways of experiencing research-based teaching described through the three categories can be assumed to influence how leadership is realised. In the following, I will discuss the different conceptions in relation to the two research traditions outlined in the introduction.

Research is available – it is about implementing results

Based on the interviews with the principals, they seemed to see themselves and the teachers as research consumers who search for useful research findings. The principals expressed that teachers learned and developed teaching from research, but found it difficult to implement the results. The most dominant conception of research-based teaching was the implementation of research results, but the principals and teachers

found it difficult to know which research to relate to, as the results can sometimes be contradictory or difficult to interpret. These findings are consistent with previous studies (Hultman, 2015; Håkansson & Sundberg, 2016).

Apparently, the principals mostly did not ask themselves what educational problems the pupils in their schools (K-9) had or what specific developmental work the school needed to prioritise. They adhered to modern trends and bestsellers written by international researchers, or easily available research and research reviews. The methods and practices recommended by The Swedish National Agency for Education were often used in school development, because they were seen as credible and are readily available. In such examples, the development towards specific goals and priorities remains unclear. The question of how principals develop a common understanding of goals and activities with an eye to ensuring that teachers will find it meaningful to work in that of the common understanding is seen as critical by Leithwood and Jantzi (2006).

In the interviews, the principals often mentioned internationally known researchers such as Paul Black, John Hattie, Helen Timperley, and Dylan Wiliam. This can be seen as an example of the impact a certain type of research can have, such as assessment for learning (Wiliam, Black), visible learning (Hattie) or collegial learning (Timperley), depending on how the research is launched and what problems it is seen to address. Limited examples of an analytical and critical approach to the research were reported, but that does not mean they were absent (cf. Hörnqvist, 2014). With reference to the abovementioned researchers, assessment for learning and visible learning are key strategies for many principals today (Eriksson, 2017; Hirsh & Lindberg, 2015). This type of research-based knowledge has had a great impact in primary schools and has contributed to the use of templates and structures by teachers when planning and organising teaching. These concepts and models have been adopted by a large number of different actors, including The Swedish National Agency for Education (Wermke, 2013), which implicitly communicates that the efficacy of these models is scientifically proven and the latter can provide powerful governance over research and school development. However, if such general research results prove to be successful, it does not necessarily mean that they are valid in all contexts and situations (cf. Håkansson & Sundberg, 2012). The studies by researchers who represent this type of result are often more nuanced than the findings presented by authorities and schools (Hirsh & Lindberg, 2015).

The principals stated that teachers chose research summaries and literature translated into Swedish because they were unaccustomed to reading English literature, had poor access to databases and research articles, and enjoyed limited opportunities to discuss and reflect on research results and shortcomings in teachers' research skills. These results are consistent with previous studies (e.g., Håkansson & Sundberg, 2012; Levinsson, 2013; Swedish Schools Inspectorate, 2019; Wermke, 2013).

A leadership requirement that stems from the category *use of current research* is to create a common sense of the purpose of research-based teaching in schools. The

principals exercised both instructional and transformational leadership, either by controlling the content that characterised the teaching and/or creating the conditions that would enable teachers to implement new research-based teaching. According to Hallinger (2003), instructive leadership cannot be the only leadership role that principals have, as they need to adapt their leadership to the prevailing situation. Instructive leadership can, for example, be problematic in the higher grades, as principals often have less subject-specific knowledge than the teachers they are supervising. The results of this study indicate that the principals may need to develop better strategies and knowledge to identify current and relevant research. Transformational leadership could be identified as both principals and teachers searched and interpreted research results and shared responsibility in order to develop a collaborative school culture.

Authorities and curricula can guarantee research-based teaching

The principals showed confidence in authorities, policy texts and curricula, and perceived that teaching would be research-based if teachers followed the curriculum, which may seem surprising as Swedish curricula are documents mainly developed by politicians. However, some parts were developed in collaboration with researchers, so some parts can be seen as research based (Englund, 1986; Lundgren, 1983).

If principals perceive teaching as research-based when the teachers follow the curriculum, this presupposes that principals are familiar with the curriculum and can guide the teaching if the curriculum is not followed. As instructional leaders, the principals' task is to control and, if necessary, correct the activities. But principals must also lead teachers' interpretation and concretisation work. In order to be able to implement the teaching targets of the curriculum, qualified analytical work is required. This requires leaders who are deeply engaged in the school's instructional development (cf. Brørup Dyssegaard et al., 2017). Principals will probably need more than educational knowledge (Swedish National Agency for Education, 2012) to lead such a specialised task. To lead a school towards research-based teaching, principals probably need to spend much more time on educational tasks and less on administrative tasks, but, over the last decade, administrative tasks have come to dominate principals' work (OECD, 2014).

Reliance on teachers' knowledge

The concept, *reliance on teachers' knowledge*, responds to more accepted notions and expectations, such as teacher education. Various continuing education systems are expected to give teachers access to current and relevant research.

On the one hand, principals largely rely on teacher education and trust that teachers will continue to develop knowledge and read research after they complete their degree. Teacher education courses at universities are supposed to give teachers access to current and relevant research, and thus the expectation is that their teaching will automatically be scientifically based. In such cases, the principal's role and responsibility as a pedagogical leader can primarily be seen as transformational leadership,

insofar as they facilitate collegial learning and create a climate in which teachers are engaged in their own learning.

On the other hand, the results show that there are principals who want to determine their schools' educational alignment, design the learning, and decide how teachers are to teach. Principals argue their position on the basis of research in support of a particular pedagogy or teaching style and expect teachers to follow their lead (cf. Benett, 2016). Thus, it seems likely that teachers' teaching methods will increasingly be shaped by principals. In the interviews, the principals did not critically reflect on their choice of a particular pedagogy. They chose their teaching methods without considering other methods in the same field or subject. Nor did they consider whether there was any valid criticism of their chosen teaching method (cf. Hörnqvist, 2014). In this case, the principal's role and responsibilities can be seen as instructive leadership where the focus is on principals as those who hold knowledge, power and authority. Principals used research to emphasise their arguments for certain teaching choices in discussion with teachers and had a strong influence on what was taught in the classroom and how it was done. A risk from this perspective is that principals define what research-based teaching can be, control teachers in their interactions with pupils, and minimise teachers' autonomy and professionalism.

Conclusion

The results of the interview study featured in this article suggest that principals and teachers can learn from research and that it should be consumed and implemented in school, but also that there are many difficulties to overcome in achieving this. The results are in line with previous research, in the sense that relevant research by university researchers is available, but that there are insufficient structures and methods to ensure reliable implementation of the results in schools (cf. Slavin, 2008). Application of research results is thus in several respects perhaps the most dominant notion of what teaching on a scientific basis entails. Principals' conceptions come from traditionally accepted beliefs and expectations, which is in line with how national reforms are implemented (cf. Stigler & Hiebert, 1999).

Even though practice-based research has been supported by the Swedish Institute for Educational Research, Ministry of Education, universities, the government, and municipalities for decades, it is not yet widespread or well known. In the phenomenological study reported here, there are neither discussions about nor examples of teacher-driven, practice-based research projects in collaboration with researchers, with the ambition of teaching development. Based on the assumption that principals take responsibility for leading knowledge production in their own schools, alternative conceptions of what has been described in this article may emerge – ideas that in another way problematise the dominant belief that research results should be consumed and implemented in schools. Practice-based research projects can be a way of strengthening scientific competence in schools as teachers work together with researchers (Eriksson, 2018).

The results of this study show that the principals' conceptions were influenced by both instructional and transformational leadership models. On the one hand, there were examples of top-down governance in terms of implementing research-based teaching through school laws, curricula, and principals' control of teaching. This leadership worked to influence the conditions that had a direct impact on what was taught in the classroom and how it was done. The principals tried to guide and steer teachers towards defined goals. On the other hand, the results show examples of bottom-up governance, where the principals determined the direction of the research-based teaching but left the implementation to the teachers. This type of leadership is linked to building teachers' ability and willingness to affect students' learning, and to participate in the work towards goal fulfilment (cf. Hallinger, 2003).

This study has not been able to answer questions of how principals conceptualize teacher's involvement in teacher-driven, practice-based research projects, or which structures and models principals are interested in developing. Therefore, the question of the role and function of principals in those research projects remains unanswered. In future studies, independent primary schools should also be included, as this study only includes municipal primary schools, which can be seen as a limitation.

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