Data- and research-informed improvement work in ECEC

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Abstract
The article describes an approach to data- and research-informed improvement work in Early Childhood Education and Care (ECEC) that is used by the Laboratory for Research-based School Development (LSP) at Aalborg University, Denmark. The approach includes collaboration between research, policy and practice and it incorporates two current policy priorities in the field of Danish education: evidence-informed decision making and the continuous improvement of the learning environment. The approach is based on the core idea that it takes a collective effort and widely distributed leadership to ensure the well-being and learning of all children. Additionally, the approach rests on the hypothesis that the use of evidence assists ECEC services to accomplish goals of high-quality learning environments, and the improvement work can drive efforts to use knowledge from data and research. Consequently, in this approach, data- and research-based knowledge is used as an essential indicator of quality and as a trigger for professional learning and development (PLD) of the teaching staff. Furthermore, leadership is seen as essential in relation to the PLD of the teaching staff and their use of evidence.

Keywords: *Early Childhood Education and Care; data- and research-informed; improvement work; learning environment; professional learning and development; leadership; whole system approach*

Introduction

The purpose of this article is to describe the approach to data- and research-informed improvement work in ECEC which is used by the Laboratory for Research-based School Development (LSP), Aalborg University, Denmark in various research and development projects in both ECEC and schools. In this approach, improvement work in ECEC is about securing the wellbeing, learning and development of all children through a continuous focus on improving the learning environment and its pedagogical practices (Hopkins, 2005). Moreover, an essential element underpinning improvement through this approach is the use of data and knowledge from research. These different kinds of evidence are used as an essential indicator of quality and as a trigger for the professional learning and development (PLD) of the teaching staff. Central to this approach is a mapping of the learning environment, carried out 2-3 times in each project at 2-year intervals, as well as targeted PLD initiatives for the teaching staff related to areas that data from the mapping indicate will be beneficial to work on. Leadership is deemed essential to both the PLD of the teaching staff and their use of evidence.

In this article, current policies and tendencies in the Danish ECEC context and a perspective on Danish improvement work in ECEC are introduced, with reference to various Danish policy documents. Secondly, the overall design of the improvement approach is described. This description focuses on three essential topics: use of data- and research-based knowledge; PLD of the teaching staff; and leadership tasks and roles. For each topic, there is a short review of selected literature and a description of how the topic appears in the approach. Finally, the article discusses the implementation of this approach and draws on insights from two research and development projects in which the author is involved: Research-based Development of Learning Environments in Kristiansand (FLiK), Norway, and the Program for Learning Leadership, Denmark.

ECEC in Denmark: The overall framework

Danish ECEC includes crèche / nurseries and family day-care (children aged 0-3 years); kindergartens (children aged 3-6 years); and age-integrated facilities (children aged 0-6 years). In kindergartens, crèche / nurseries, and age-integrated facilities the teaching staff is often a combination of teachers (pedagogues) with a bachelor's degree, and different types of assistant who generally have few or no formal qualifications. Additionally, there are no formal education or training requirements for child-minders in family-day–care services (Sølvhøj, 2009; Winther-Lindqvist & Svinth, 2017). Danish ECEC services have three overall purposes of equal importance: educational, social and caring. These three purposes are related to the objectives in the Danish Day Care Act which promotes the well-being, development and learning of each child in cooperation with the child's parents (Formål for dagtilbud, 2016). Most of the Danish ECEC services are public. While the Danish state has the overall responsibility for each service, each local authority (also called a municipality) is responsible for the structure and organisation of the ECEC services and facilities. In Denmark, there are 98 municipalities divided into five regions (The Ministry of Social Affairs and Integration, 2011).

In Denmark, 98% of children aged 3-5 years and 90% of children aged 1-2 years attend ECEC (Danmarks Statistik, 2011). Consequently, it has become a growing political ambition to create high-quality ECEC services to enhance wellbeing and learning for all children (Børne- og Socialministeriet, 2017). Research into the relationship between children's early acquired cognitive and social outcomes and their performance in school and later in life reveals the importance of this ambition (Cunha & Heckman, 2010). Similarly, research indicates that high-quality ECEC services can support social mobility and create early interventions, as well as having the potential to develop a pedagogical practice that in the long term contributes to lifelong learning for the individual (EURYDICE, 2009; Sylva, Melhuish, Sammons, Siraj-Blatchford & Taggart, 2010).

High quality in Danish ECEC services

In Denmark, quality in ECEC is often viewed as a multidimensional phenomenon comprising many different aspects (Sheridan, Kärrby, Giota, Ogdefelt & Björek, 2003). Additionally, changing societal conditions and requirements mean that quality is not developed once and for all, but remains a continuous task (Penn, 2009). In Denmark, a main initiative related to the aim of creating high quality in ECEC was the creation of the first national curriculum in 2004. This curriculum of six general learning themes was implemented into a play-based tradition with the primary purpose to ensure that all ECEC services and their local authorities (municipalities) worked systematically, visibly and in a professional manner to support the learning of all children (Brostrøm, 2004; Social Ministeriet, 2005). Evaluation and research into the implementation of the curriculum shows an overall positive impact, although it was also revealed that the quality of Danish ECEC services varies significantly. There is still room for improvement, especially when it comes to the systematic documentation and evaluation of learning, not just of activities, and the learning and development of children with special needs (Belling, Kirkegaard, Broström & Skriver, 2016; Danmarks Evalueringsinstitut, 2012).

In 2012, work on creating high quality in Danish ECEC services resulted in a political initiative known as the "Task Force on Daycare of the Future" (Ministeriet for Børn og Undervisning, 2012). The Task Force made four recommendations deemed as being especially important:

1. Reflective and well-planned teaching practices that focus on children's learning and inclusion
2. Targeted collaboration between parents and the ECEC service
3. Strong assessment practices focusing on quality improvement
4. Professional and strong leadership at all levels

(Ministeriet for Børn og Undervisning, 2012, p. 6)

Strong ECEC services for all children

In June 2017, the above recommendations were followed up by a new political framework called "Strong ECEC services for all children" (Børne- og Socialministeriet, 2017). In July 2018, this new framework resulted in a new Day Care Act with a more focused curriculum. The new framework and curriculum intend to continue the focus on systematic documentation and evaluation, including the use of data and research as a trigger for reflection, analysis and development of improvement strategies (Børne- og Socialministeriet, 2017). Hence, the political framework has a strong focus on professionalism, strong leadership and an evidence-informed practice (Børne- og Socialministeriet, 2017).

Leadership in Danish ECEC: current tendencies

Today, successful leadership in Danish ECEC links to the realisation of creating a high-quality learning environment for all children, as described in the Day Care Act and the new political framework (Formål for dagtilbud, 2016; Børne- og Socialministeriet, 2017). This view of leadership has resulted in an increased political intention to strengthen leadership roles and tasks, as well as guidance on how to successfully lead a high-quality learning environment (Danmarks Evalueringsinstitut, 2017). A memorandum, conducted for a National Leadership Commission about "The development of leadership roles and tasks in Danish ECEC services" emphasises the necessity for ECEC leaders to develop pedagogical leadership, stronger professionalisation, data- and evidence-informed practice, and analytical competencies (Danmarks Evalueringsinstitut, 2017 pp. 22–23). Hence, to lead successfully in a Danish ECEC context is more and more perceived as an ability to create an organisational culture which includes continuous and collaborative data- and research-informed improvement work. For many leaders in ECEC, as well as for their teaching staff, this involves new tasks and roles. However, although this work needs the participation of both teaching staff and leaders, it is the responsibility of the ECEC leaders to lead this work and to ensure that it will lead to improvement of the learning environment (Børne- og Socialministeriet, 2017). Correspondingly, an OECD review of school resources in Denmark reveals that:

> There is evidence of a growing willingness at all levels of the system to dialogue around pedagogical needs and to build on collaborative work to improve student achievement and wellbeing. However, the shift towards a culture of using data to improve student learning is still in its infancy. Teachers, school leaders and municipalities still face challenges in focusing on improved student learning, and there is a need to strengthen the capacity of the different actors to work in a goal-oriented way. Embedding a learning focus in practice is a major cultural shift that needs to be implemented through a range of changes, including the further development of several aspects of teacher professionalism that are still at an early stage of development in Denmark and the strengthening of pedagogical leadership in schools. (Nusche, Radinger, Falch & Shaw, 2016, pp. 13–14)

It is assumed that a review of ECEC resources in Denmark would reveal some of the same things.

An approach to data- and research-informed improvement work

Since 2012, the LSP at Aalborg University, Denmark, has worked with an approach to educational improvement work in both ECEC and schools. The development and the implementation of the approach in various research and development projects have been based on a partnership between Aalborg University, Aarhus University, Denmark, and Inland Norway University of Applied Sciences, Norway. In this approach, improvement work in ECEC is about securing the wellbeing, learning and development of all children through a continuous focus on improving the learning environment and its pedagogical practices (Hopkins, 2005). An essential element of this approach is a mapping of the learning environment that is carried out 2–3 times in each project, at 2-year

intervals, as well as targeted PLD initiatives for the teaching staff related to areas which data from the mapping indicate will be beneficial to work with.

The approach can be described as "a whole system approach" as it acknowledges systemic conditions for developing, supporting and maintaining competence in all layers of the ECEC system in a municipality (Levin & Fullan, 2008; Urban, Vandenbroeck, Laere Van, Lazzari & Peeters, 2011). A whole system approach builds upon the assumption that the success of each ECEC service depends on shared effort and collective responsibility for the improvement of children's wellbeing and learning. In the approach, it is crucial that improvement work in the participating ECEC services, as well as the PLD of the teaching staff, is continuously supported and embedded in a coherent municipal learning system. This involves shared responsibility, collective effort and widely distributed leadership at all levels of the municipal educational system (Skov Hansen, 2016; Nordahl, et al., 2016).

In this approach, an essential element for working with improvement is the use of data and knowledge from research. This evidence is used as an essential indicator of quality and as a trigger for professional learning and development of the teaching staff. Leaders play a vital role in guiding the professional learning and development of the teaching staff and their use of evidence.

Two research and development projects

The ECEC improvement approach has been implemented in two research and development projects:

1. Research-based Development of Learning Environments in Kristiansand (FLiK) (2013–2016). The FLiK project is a collaboration with the municipality of Kristiansand, Norway and its 40 schools and 70 ECEC-services. The project includes 3,500 children in ECEC, 10,500 students in school and 2,600 associated professional practitioners (i.e. teaching staff, leaders, ECEC consultants at the municipal level). In FLiK, a quantitative mapping of the learning environment was completed in 2013, 2015 and 2017 (Nordahl, et al., 2016; Nordahl, Øyen Nordahl, Sunnevåg, Berg & Martinsen, 2018), as well as four case-studies from 2015 on topics related to the improvement of the learning environment in selected ECEC services, schools and at the municipality level (Christensen, et al., 2016).

2. Program for Learning Leadership (PLL) (2015–2019). PLL consists of both a school and an ECEC part: in the school part, 13 Danish municipalities and 240 schools participate. The school part includes almost 80,000 students and 10,000 associated professional practitioners (i.e. teaching staff, leaders, external school consultants at the municipal level). In the ECEC part, 6 of the 13 municipalities participate with 170 ECEC services. The ECEC part includes almost 5,100 children and 3,000 associated professional practitioners (i.e. teaching staff, leaders, external ECEC consultants at the municipal level). In PLL, mapping of the learning environment was completed in 2015 and 2017, with a third mapping scheduled for 2019. This article draws primarily on research from the first mapping in 2015 (Hansen, et al., 2016), as well as the preliminary results from a qualitative case-study on the use of data and research in PLL, conducted by the author in 6 ECEC services in 2017.

The three topics: Use of data- and research-based knowledge, PLD of the teaching staff and leadership tasks and roles

Use of data- and research-based knowledge: A review of the literature

Today, the use of data- and research-based knowledge is more and more seen as an essential contribution to educational improvement work and the PLD of the teaching staff in both ECEC and schools (see e.g., Bell, Cordingley, Isham & Davis, 2010; Datnow, Park & Wohlstetter, 2007; Mitchell & Cubey, 2003; Sharratt & Fullan, 2012). In an ECEC context, Mitchell and Cubey's (2003) study on the links between efficient PLD and

enhanced pedagogy reveals that work-embedded and practice-related PLD creates critical reflection, and that active investigation of own and shared practices based on analysis of own data can be an essential element in improvement work.

Additionally, Bernhardt (2013) and Datnow et al. (2007) emphasise a broad definition of data when it comes to educational improvement work. This includes the use of both qualitative and quantitative data, and it is pointed out that data on student learning and well-being, demographics, perceptions of children, staff and parents and educational processes as well as research-based knowledge, can be essential indicators of whether the chosen strategies and initiatives were fruitful - as well as a trigger for the PLD of the teaching staff (Bernhardt, 2013; Datnow, et al., 2007). Moreover, research on the use of data and research knowledge for educational improvement shows that practitioners need to develop the knowledge and skills to analyse and use the different kinds of evidence to improve the learning environment and their teaching practices (Datnow, et al., 2007; Datnow & Hubbard, 2016; Earl & Timperley, 2008). Furthermore, it is acknowledged that leaders in ECEC and schools play an important role in the use of data- and research-based knowledge for improvement (Coburn & Talbert, 2006; Park & Datnow, 2009).

Use of data- and research-based knowledge related to the approach

In the approach, all participating ECEC services participate in quantitative mapping at 2-year intervals. Mapping focuses on a wide range of factors that research indicates has a significant impact on the well-being and learning of children, and includes five groups of respondents: 1) 4-5-year-old children, 2) the key adult of each 4-5-year-old child, 3) the entire teaching staff, 4) their leaders 5) and the parents. For the children, digital survey questions are presented as sounds and graphics, and can be answered from a tablet or a computer (Nordahl, et al., 2018).

Data from the mapping provide participating leaders and their teaching staff with knowledge and insight into their learning environment as the various respondents experience it. Data are accessible through a digital mapping portal, and can be visualised in various ways, e.g. a 500-point scale, average, percentages and standard deviation. In the approach, these data will be supplemented by the additional mappings and tests that most Danish ECEC services are expected to use – e.g., tests of children's language skills, wellbeing and readiness for school. Additionally, the teaching staff will also collect qualitative data such as observations, interviews and examples of children's work.

In the approach, data from each mapping are further analysed by researchers and disseminated in research reports. These reports, as well as the data on their own ECEC service, give both the participating ECEC services and the local authority (municipality) some guidelines about the quality of the learning environment as it is experienced from different respondents. Likewise, the PLD initiatives related to the approach provide the participating leaders and teaching staff with research-based knowledge. This knowledge is mostly disseminated as lectures from researchers on a specific topic - or through a series of small booklets called "What we know about…". These booklets disseminate research knowledge on topics such as quality in ECEC, adult-child communication and relationships, children's play and experimental activities, quality in everyday situations, and children's social competencies.

The capacity to use both data and knowledge from research, as well as a structure or protocol for improvement work, is enhanced through different PLD initiatives. This article focuses on initiatives relating to the teaching staff.

Professional learning and development: A review of the literature

The professional learning and development of the teaching staff is considered essential to improvement work within ECEC and schools. This perspective is underpinned by research indicating that competent teaching staff are an essential factor in providing high-quality learning environments and practices (Hattie, 2009;

Pianta, Barnett, Burchinal & Thornburg, 2009). It is important to recognise that it is not the individual teacher, or assistant, but the teaching staff as a whole that constitutes this key factor (Hattie, Masters & Birch, 2015) and that leadership and facilitation at both institutional and system level play an important part (Robinson, 2011; Urban, et al., 2011).

The focus on PLD of the teaching staff has resulted in an interest in knowing how PLD links to children's learning and wellbeing. Research on this specific topic reveals that PLD must be:

- research-informed, i.e. informed by existing research knowledge concerning the relationship between pedagogical interventions and children's learning and well-being.
- data-informed, i.e. informed by information concerning the children's learning and well-being.
- collective.
- connected to teaching practice.
- rooted in the organisational culture of the teaching staff and ECEC leaders.

(DuFour & Marzano, 2011; Mitchell & Cubey, 2003; Timperley, 2008)

These guidelines indicate that working in a professional learning community (PLC) could be a useful framework for the PLD of the teaching staff, as well as the improvement work in ECEC and school. What encompasses a PLC has now grown to include a wide variety of concepts and practices, and there is not enough space within this article to discuss these aspects in detail. Nevertheless, a PLC is always a group of people who are motivated by a shared vision of enhancing children's well-being and learning, and who support one another towards the goals and aims envisioned. Bolam et al. (2005) highlight four characteristics of an effective PLC: Firstly, a PLC represents a collective effort to enhance student learning. Secondly, it promotes and sustains the learning of all professionals in the school. Thirdly, it builds knowledge through inquiry and, finally, it analyses and uses evidence for reflection and improvement. Cherrington and Thornton (2015), among others, have introduced PLCs in the ECEC context.

Professional learning and development related to the approach

As mentioned earlier, the capacity to use both data and knowledge from research is enhanced through PLD initiatives. These initiatives follow the principles identified in the section above and are all anchored in the experience and practice of the participating teaching staff (Hansen, et al., 2016; Nordahl, et al., 2018). Furthermore, in the PLD initiatives, the teaching staff will be organised in PLCs. In the approach, each PLC has a team coordinator who takes specific responsibility for leading colleagues through the exploration of data and for implementing research as part of their shared inquiry and improvement work (Hansen, et al., 2016; Nordahl, et al., 2016).

As a framework for this work, each PLC uses a specific protocol called "The model for pedagogical analysis". This model has previously been implemented in about 550 Danish schools and 230 ECEC services from 2007–2011 (Andresen, 2010; Nordahl, et al., 2012). In the approach, the model for pedagogical analysis provides PLC members with a structured way to analyse and reflect upon the challenges which data reveal. The model and its phases (see Figure 1) are based on system-theoretical thinking, which sees the interrelationship between the context (learning environment, teaching, pedagogical activities) and the wellbeing, learning and development of each child (Nordahl, 2013).

When the teaching staff work with the pedagogical analysis in their PLC, the emphasis is put on room for reflection and action. The aim here is that the teaching staff are given a systematic analytical framework for data- and research-informed improvement work, as well as the opportunity to contribute to and collaborate on tasks related to their practice (Nordahl, 2013). The opportunity to collaborate with colleagues encourages teaching staff to challenge their thinking, share and acquire new knowledge and internalise it (Nordahl & Skov Hansen, 2016).

Pedagogical analysis	
Analysis	Formulation of objectives Collecting data and information Formation of challenges, themes or problems Analysis and reflection
Strategy and initiatives	Development of research-informed strategies and initiatives Implementation of the chosen strategies Evaluation Revision

Figure 1: Model for pedagogical analysis

In the approach, the pedagogical analysis is introduced through the first PLD initiative. The intention here is that the model for pedagogical analysis functions as a common framework for data- and research-informed improvement work. Additional PLD initiatives all take their starting point in different topics on essential areas of the learning environment and children's well-being, learning and development. In PLL and FLiK, the choice of topic for subsequent PLD initiatives has been based on data analysis and reflections made by the leadership team in each participating ECEC service. In both projects, this work included collaboration with the PLC and its members - especially the team coordinator. Moreover, in the two projects, each PLD initiative related to the approach included written assignments based on three to four e-learning modules, including the reading of research articles and literature and analysis of data from their own learning environment. In both projects, the teaching staff in each PLC received feedback on their assignments either from an ECEC consultant at the municipal level, or a representative from their own leadership team (Hansen, et al., 2016; Nordahl, et al., 2016).

Both projects found that working with research knowledge and data from their own practice was an essential trigger for the PLD of the teaching staff and improvement of the learning environment. However, case-studies from these projects also indicate that it can be challenging for participating leaders and teaching staff to engage in dialogue around pedagogical needs and to build on collaborative work designed to improve the learning environment and the wellbeing, learning and development of all children. Similarly, the FLiK project research reveals that, in practice, using data- and research-based knowledge to embed a shared learning focus involves a shift in culture for some ECEC services, leaders, teaching staff, and consultants at the municipal level (Christensen, et al., 2016). Finally, data from the three mappings in FLiK reveal that teaching staff have benefited from working in a PLC. From the first mapping in 2012, to the final mapping in 2017, there has been positive and significant development in the following areas: collaboration on children, collaboration among the teaching staff in general, and assessment of their own competence and job satisfaction. Likewise, data on children's well-being, communication, language and social skills, from the first mapping to the final one, indicate positive development. However, there is still a variation in quality within the municipality and, while this is smaller in 2017 than it was in 2012, there remains room for improvement (Nordahl, et al., 2018). In FLiK, as well as PLL, leadership plays an important role in securing improvement goals at all levels of the municipal system (Christensen, et al., 2016; Nordahl, et al., 2018).

Leadership tasks and roles: A review of the literature
Robinson, Hohepa and Lloyd (2009) link leadership to student outcomes. In their meta-analysis on "School leadership and student outcomes", they state that when school leaders promote or participate in effective PLD

of the teaching staff, they have an impact on the whole school. Leadership related to PLD of the teaching staff and educational improvement is often characterised as "instructional" or "pedagogical" (Qvortrup, 2015). According to Robinson (2011), this kind of leadership has multiple tasks: in addition to the development of the organisational culture, pedagogical leadership should also focus on continuing the PLD of the teaching staff as well as their use of evidence for improvement work.

Likewise, research on data- and research-informed improvement work stresses the importance of leadership planning for use of evidence, preparing for group structures, and understanding and allowing for collaboration in which the establishment of an ongoing cycle of inquiry for improvement is essential (Bernhardt, 2013; Timperley, 2011). Moreover, it is important that leaders establish a vision for use of evidence and communicate this to the teaching staff, align goals for children's learning and wellbeing with available data- and research-based knowledge, and provide for distributed leadership (Coburn & Talbert, 2006; Datnow, et al., 2007; Hamilton, et al., 2009). The necessity of distributed leadership in relation to data- and research-informed improvement work is also emphasised by Park and Datnow (2009) who state that data- and research-informed decisions are most successful in a culture of distributed leadership and shared decision-making.

The term "distributed leadership" is often used to articulate the social distribution of leadership, and how leadership work and tasks are shared and supported by formal or informal leaders and structures across the organisation (Spillane, Halverson & Diamond, 2004). DuFour and Marzano (2011) point out that educational improvement work is too complex to leave in the hands of few individuals. Instead, a collaborative effort is needed to improve learning and well-being for all children, ensure a learning environment for all children, and lead quality ECEC work within a municipality. When leadership is distributed in relation to improvement work, and thus the PLD of the teaching staff, leaders and their teaching staff have to see themselves as leaders of learning - whether they are working to improve children's learning and well-being, collaborating with colleagues, or as part of the leadership team (DuFour & Marzano, 2011; Hargreaves & Fullan, 2012).

Leadership tasks and roles related to the approach
In the improvement approach, pedagogical leadership related to the PLD of the teaching staff and their use of data- and research-based knowledge involves multiple tasks and roles. As described in the previous section, these involve planning for the use of evidence, preparing teaching staff to work as a PLC, and supporting them to use the model for pedagogical analysis as a framework and structure for their work. In Denmark, the use of data- and research-based knowledge is not common practice for most teaching staff. This highlights the importance of leaders in participating ECEC services creating a vision for the use of data- and research-based knowledge and communicating this to the teaching staff. Moreover, the leaders need to align goals for children's learning and wellbeing with available data, and provide distributed leadership, in which the responsibility for leading and implementing data- and research-informed improvement work is shared and enacted with the teaching staff as well as with consultants and leaders at the municipal level.

In the approach, both formal leaders in ECEC, consultants at municipality level and the team coordinator, play an important role in modelling the use of data- and research-based knowledge through communication to the teaching staff as well as to each other. The team coordinator leads the evidence-informed work of the PLC, and this work is supported by their own leaders as well as the external consultants at the municipal level. Interviews with six team coordinators in PLL made by the author in 2017 reveal that the facilitation of the formal leader is especially essential for the team coordinator and the work of the PLC. These interviews also reveal that in some ECEC services the formal leaders plan and reflect with the team coordinators before and after a PLC meeting. This is highly valued by the team coordinators who state that it can be a challenge to lead colleagues as well as to model the use of evidence in a PLC. Consequently, the role of the team coordinator is an example of a distributed leadership, which requires the explicit support of the formal leader.

Closing remarks

In this article, a "whole system approach" to data- and research-informed improvement work has been described. The approach provides an example of how the use of knowledge from data and research can inform teachers' professional learning and development and continuous improvement work. Different kinds of evidence provide the impetus for ensuring that improvement work in each participating ECEC is focused, and needs-based. Consequently, priority-setting and strategic ECEC improvement work shift from personal or shared suppositions (I/we "think" we need…) to evidence-informed conclusions (our data and knowledge from research indicate that…) (Nordahl et al., 2018). The approach relates in many ways to current policies and tendencies in ECEC, and the *Strong ECEC-services for all children* political framework, in particular (Børne- og Socialministeriet, 2017). Both the approach and the new framework acknowledge the importance of pedagogical leadership in ECEC.

In the approach, there is a specific focus on leadership tasks and roles related to the PLD of the teaching staff and their use of data- and research-based knowledge. While it is acknowledged that leadership related to the PLD of the teaching staff and their use of evidence implies distributed leadership, it is also important that the formal leaders in ECEC support their staff in taking up leadership roles, whether working to improve children's learning and well-being, or collaborating with colleagues in a PLC team coordinator role. Consequently, the question of who leads has more than one answer in the approach described in this article. Nonetheless, it remains a necessity for formal leaders in participating ECEC services to take on strong pedagogical leadership that supports successful data- and research-informed PLD and improvement work.

Acknowledgement

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