

Studying Teacher Shortages: Theoretical Perspectives and Methodological Approaches

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Abstract: Teacher shortages are a phenomenon of growing international concern. The causes of this phenomenon are the focus of the research project What About Teacher Shortage (WATS up), which uses an international comparative perspective to analyse teacher shortages in Denmark, Germany, and Sweden. Because the nature of teacher shortages' development is complex and influenced by several interacting factors, this theoretical article accounts for the complexity of the phenomenon and introduces a theoretical and methodological model for empirical research. The theoretical starting point is a policy problem approach; more precisely, one that adapts Bacchi's model on focusing 'what the problem is represented to be' (WPR). Due to variations between the studied countries, a multiple case design is chosen as the methodological approach. This allows an individual analysis as well as a comparison of the countries. A methodological model comprising 8 parameters and 23 indicators summarizes the interacting factors influencing teacher shortages.

Keywords: Teacher Shortage, International Comparative Research, Methodological Model, Denmark, Germany, Sweden.

INTRODUCTION

One of the most relevant responsibilities of education policy is to guarantee schooling for every child of school age. To meet this obligation of providing qualified education at elementary and secondary schools, a balance in teacher supply and demand has to be established. According to the Organisation for Economic Co-operation and Development (OECD), a country's demand for teachers depends on different factors: the age structure of the school-age population, enrolment rates, the starting and ending age of compulsory education, the average class size, and the teaching load of teachers. Supply is influenced by teacher education, employment and working conditions, and job opportunities outside education (OECD, 2022). An imbalance of supply and demand—more precisely, a teacher shortage—causes turmoil in the public as well as in the scientific discourse. Currently, these often heated discussions are active in various countries across several continents. Therefore, teacher shortages appear to be a phenomenon of international concern. For instance, García and Weiss (2019, p. 1) have pointed out that 'the teacher shortage is real, large and growing' in the USA, and See and Gorard (2020, p. 416) have asked why English schools 'don't [...] have enough teachers'.

Focusing on Europe, Federičová (2021) examined teacher turnover across five regions. She pointed out that the overall teacher turnover rate in the 19 countries considered is around 28%. Of note is the remarkable variation between regions: in Southern European countries like Italy and Portugal, the turnover rate appeared to be rather low (16% and 14%, respectively), but reached up to 39% in Northern European countries like Sweden. This high volume of professional exits has contributed to the current shortage of qualified teachers in Sweden. Moreover, according to Bertilsson (2018), recruitment into teacher education studies poses a challenge of historic proportions. All in all, the Swedish National Agency for Education (Skolverket, 2019) forecasts a lack of 80 000 authorized preschool teachers up to 2031. A similar situation can be outlined for Denmark: more than every third Danish teacher

(35%) leaves the profession at some point in his or her career path (Federičová, 2021). Moreover, the number of elementary school teachers without official qualifications increased from 10.3% in 2012 to 18.1% in 2019 (Arbejderbevægelsens Erhvervsråd, 2021), which underlines a growing demand for qualified teachers.

Although teacher turnover does not appear to be an issue of significance in Germany, the German educational system suffers from an unbalanced teacher labour market. The teacher shortage is a pressing problem in many German federal states. For instance, the Standing Conference of the Ministers of Education and Cultural Affairs (Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland [SSKKLBD], 2022) forecasts an increase in the country's annual demand for new teachers, though the supply of teachers will remain at almost the same level between 2021 and 2035. Due to Germany's complex federal structure, further differentiation between regions, school types, and subjects can further clarify the picture. While the demand for teachers in the upper secondary school system (Gymnasien) seems to be mostly met, vacancies remain, for example, at vocational schools, in subjects like mathematics or IT, and in Eastern German schools (SSKKLBD, 2022). Another variable to take into consideration is teachers' aging: 36% of primary and secondary teachers were 50 or older in 2015. This percentage is higher in Latvia and Germany (both 45%), Estonia and Lithuania (both 47%), Bulgaria (48%), and Italy (57%) (Eurostat, 2017).

Identifying teacher shortages as a phenomenon of international scope raises the question of differences and similarities between countries on multiple levels. To approach this question from an international perspective, researchers from Aarhus University, Mid-Sweden University, and the University of Wuppertal initiated the research project What About Teacher Shortage (WATS up), funded by the Swedish Research Council (grant period: 2021-2023). WATS up network researchers collaborates to explore, compare, and explain teacher shortages in three European countries. Within this project, junior and senior researchers from Denmark, Germany, and Sweden share their multi-faceted expertise focusing on the following questions:

- How can the respective country's current teacher shortage situation be described?
- What are the main explanations/reasons for teacher shortages in the three countries?
- What similarities and differences can be seen between the three countries and how can these similarities and differences be explained?
- How can each country correct its shortage of teachers in the short and long term?
- How can the three countries' varying situations and contexts be related and compared?

A comparative approach to answering these questions can shed light on the differences and similarities between the three countries and contributes to the international research discourse on teacher shortages. International comparative research allows insight that could support detachment from established national views to allow for a broadening of perspectives (Kosmützky, 2017). However, such an approach also entails methodological peculiarities that demand complex, well-considered research designs (Kosmützky, 2017). To approach international comparative research on teacher shortages, we must first address whether it is adequate to compare research findings from countries like Denmark, Sweden, and Germany. The second question to be dealt with is how to structure a comparison of countries that also accounts for those countries' national peculiarities. The following sections outline the answers to these questions.

Aim

The purpose of this article is to present a model for analysis and comparison of teacher shortages in three exemplary countries (Denmark, Germany, and Sweden) with large differences in the institutional structure of the educational systems as well as in the types of challenges schools have to face and address. The research questions are:

- RQ 1) What theoretical considerations are required for a comparison of three different countries on the issue of teacher shortages?
- RQ 2) What methodological considerations are required for a comparison of three different countries on the issue of teacher shortages?

RQ 3) What categories, parameters and indicators are needed to describe and analyse teacher shortages?

Some Research on Teacher Shortages

The apparent ubiquity of teacher shortages is reflected in the large number of studies that research this topic internationally. To adequately address the multifaceted issue of teacher shortages, we must first consider how to address this issue methodologically. The following section will examine the methodological approaches that a selection of international researchers has applied. Subsequently, the methodological approaches of research exploring teacher shortages in Sweden, Germany, and Denmark are examined.

Boe (1996) attempted to understand the issue by conceptualizing teacher shortages quantitatively (i.e., the number of teachers) as well as qualitatively (i.e., teacher qualifications). Boe's research strategy consisted of three steps. The first step was to design or take an existing teacher shortage model to determine aspects that are used to constitute teacher shortage. In the following step, he constructed a suitable database to meet quantitative as well as qualitative requirements. The third step was to quantify the variables.

More than two decades later, Sutcher, Darling-Hammond, and Carver-Thomas (2019) examined the same subject. In their study, a projected teacher shortage was related to changes in pupil-teacher ratio, enrolment, and attrition. The research group was also interested in the relationship between teacher demand and supply, and to what extent a mismatch between the two existed and/or varied. Further, they were interested in finding out the primary causes of a teacher shortage and what policy could be applied to find possible solutions. The operationalization of the conceptual content of a 'teacher shortage' addressed variables such as student numbers, location, subject area, local and national dimensions, and other specific indicators by state, school and student type (Sutcher et al., 2019). The authors also examined other factors affecting teacher supply, demand, and shortage (such as salary and working conditions) and concluded that the limited view of the difference between supply and demand in the teaching profession made it difficult to find possible solutions. 'While policymakers often focus on how to recruit more teachers when there are shortages, our findings suggest it is equally important to recognize policies that decrease teacher attrition' (p. 27), they noted, emphasizing policies that could improve teachers' working conditions: for example, those that maintain a stable supply of teachers as well as mentoring programs.

Because teacher shortages are a phenomenon that can be found in almost all countries, the situation is often examined comparatively in international studies. As did those described above, these studies have analysed quantitative data. The topic is a significant element on the agenda of inter- and intranational organizations such as the OECD (2021), because—in addition to affecting life opportunities through education—it also concerns the issue of educational quality and employability. For instance, teachers in Germany receive more pay than their colleagues in Denmark and Sweden. Considering the difference in purchasing power between the countries, one can question the usefulness of comparing such data without contextualizing respective country-specific characteristics. Steiner-Khamsi (2016) problematized the use of global indicators of teacher shortages as a 'problem recognition filter' on the national and local levels: 'That is, global indicators narrow the perspective of local actors and determine what they recognize, or do not recognize, as a problem requiring a solution' (p. 573). The general problem concerns international comparative studies that do not sufficiently deeply investigate the specifically different characteristics and educational policy entanglements of the units of analysis. A focus on pre-identified (international) problem indicators can distract from national and local peculiarities and aims to imply a best one-way practice that may create new problems by failing to adequately address or even overshadowing regional or local problems. Steiner-Khamsi saw case studies as an inevitable prerequisite for a contextual comparison, specifying, '[i]deally, a comparative study draws on several cases, a few cases, or a single case, as part of the same study. Furthermore, a case study must produce a 'thick' description and is, by

definition, both horizontal and vertical. It draws on many variables and rests on a sample size of one' (p. 584).

The following paragraphs discuss research topics in Denmark, Germany, and Sweden which are particularly related to teacher shortages in a regional or country-specific context, to identify their methodological approaches. Fibæk Laursen (2021) saw the challenge of the current teacher shortage in Denmark in the decline of the number of applicants which is a result of insufficient efforts to increase the number of student teachers. Following Fibæk, the number of teacher students trained in June 2021 is equal to the number of teacher positions needed. However, an increasing number of student teachers do not work as teachers, resulting in an imbalance between supply and demand (Fibæk Laursen 2021, p. 49). In this context, he saw a danger in the establishment of new forms of teacher training, intending to solve the problem of teacher shortage on short notice.

Zymek and Heinemann (2021) approached teacher shortages from a professional-historical perspective. However, their analytical focus was not a structural matter (as it was in Fibæk Laursen's work in Denmark), but rather an outline of the history of the teaching profession in Germany with a focus on women in the teaching profession. The authors linked their discussion of the development of the teaching profession to school and university reforms and developments as well as to demographic and social change in Germany. Historically, the teaching profession has been marked by recurring teacher shortages and has responded repeatedly with flexibility and emergency solutions until the emergence of the next phase of teacher shortages. For example, the 'baby boom' from 1950 to 1965 caused a tripling of student teachers by 1975, followed by an annual decline in births that led to a 50% reduction in the number of students between 1970 and 1985 and had a substantial impact on teacher demand (Zymek & Heinemann, 2021, p. 372). One can note, in the history of the teaching profession, the cyclical effects of changing demographics and teacher needs followed by changing periods of recruitment freezes and teacher shortages.

Another perspective on the teacher shortage phenomenon attends to teachers' transition from the phase of their own education to their entry into the profession. Böwadt and Vaaben (2021) explored the professional identity of student teachers and new teachers through three main topics. The first was student teachers' formation of a professional identity and the motivation to teach as well as newly qualified teachers' assessment of the teaching profession. Second, theoretical and practical knowledge were debated controversially; the third area of the authors' focus concerned the student teachers' and new teachers' views of their 'understanding of reality' (i.e., what it means to be confronted with reality in the classroom and school; Böwadt & Vaaben, 2021).

Like Böwadt and Vaaben, Czerniawski (2008) also dealt with the question of new teachers (i.e., emerging teachers). His comparative study included Norway, Germany, and England. The starting point of the study was the assumption that the course of globalization of educational institutions and knowledge regimes had formed a 'post-modern' type of teacher, whose practice was characterized by comparative competition and performance indications. Czerniawski challenged this assumption of the teaching profession's homogenization, addressing institutional conditions, individual agency, and the influence of globalization on the development of teachers' professional identity. The study's theoretical framework included both the macro- and micro-sociological contexts: the former comprised structural levels (i.e., the global, national, regional, cultural, and institutional levels), and the latter comprised individual social interaction. There, teacher practice and individual action—in interplay with structural factors—played an important role (Czerniawski, 2008).

In the first step, Czerniawski examined national characteristics. In Norway, 'equality' (i.e., schools and education for all) is stressed, and in Norwegian teacher training, the student teacher is not encouraged to act in an authoritative way but as a supervisor. In Germany, the tripartite school system structurally contradicts the equality approach. Teacher training can vary according to school type and to the federal state in which teacher training takes place, as education policy is also influenced by the federal states. In contrast to Norway and Germany, England has a highly regulated but very diverse school system that

allows for multiple options in teacher education. Czerniawski's study underlined that, despite converging global dynamics, professional identity and its values are bound—to a considerable extent—to national and local teacher cultures and thereby also influence the possible understanding of and solutions to teacher shortages.

An important factor in teacher shortages is profession exit (i.e., why teachers stop and change their profession). Hald (2021) addressed this question by examining school-based teacher education. Her research concerned the relationship between theory and practice in teacher education and showed that student teachers preferred the practical experience of working in their schools to the theoretical part of their training. Therefore, it seems worthwhile to analyse how attractive teacher training programs are for potential students.

Plauborg et al. (2022) chose a different approach, seeking to understand teachers' motivation to continue teaching and remain in the teaching profession. The research group conducted a meta-analysis of 122 studies that addressed the issue of teacher shortages, working conditions of teachers, and alternative approaches to retaining teachers. By discussing not only teacher identity and the transition from teacher education to school practice, but also the 'positive' moments of teacher work, the authors emphasized that the first three years in the teaching profession, finding one's place, and feeling comfortable were important elements for new teachers. According to the authors, the following four elements contribute significantly to teachers' retention: '(1) A professional identity to cope with difficult tasks, (2) self-care to develop resilience to stress, (3) a school culture, which balances individual and institutional values, and (4) professional autonomy' (Plauborg et al., 2022, p. 9). They argued that it was important for (new) teachers to develop the ability to face difficult situations and develop the resilience to act decisively in difficult situations. Furthermore, professional autonomy plays a significant role in motivation and a functioning teaching career. In this context, autonomy refers to teachers' freedom to plan and conduct their lessons independently, as well as to evaluate the situation of the students in their classes and, if possible, to change it. Additionally, teacher autonomy is based on co-determination in decision-making processes in the school (Plauborg et al., 2022).

In a comparative study of Sweden and Germany, Wermke, Olason Rick and Salokangas (2019) also addressed the topic of teacher autonomy by exploring how teachers in those countries experience and assess their autonomy. In that study, the teaching profession was understood as a layered phenomenon (i.e., comprising individual teachers and various (subject) teacher groupings). The researchers chose Sweden and Germany for their comparison because, among other reasons, the countries have different governance regimes, which have an influence on the experience of autonomy. In Sweden since the 1990s, a governance regime has prevailed that is characterized by "standard-based reforms', envisaged controlling schools' output through the setting of standards and the evaluation of schools. Competition strategies, or so-called choice policies, have been central. This means mainly that quasi-markets are established within the education system; for example, by shifting from supply to demand financing (Englund, 2012)" (Wermke et al., 2019, p. 307). The authors argued that, in contrast to the Swedish system, the German school system is centrally organized and regulated with respect to the federal states, inter alia, in the area of financial allocation, curricula, and teacher training. Another difference is the fact that, in Germany, the status of the teacher as a civil servant remains largely untouched (Wermke et al., 2019).

To capture teachers' perceptions of their professional autonomy, the researchers used a grid that represented teacher autonomy multi-dimensionally. There, the domains of education (lesson planning, delivery, and evaluation), social (discipline policies, tracking, and special needs), development (formal professional development), and administration (scheduling, time, and financial resources) were related to the levels classroom (relations to students and teaching content), school (relations to principals, colleagues, parents), and profession (relations to the state and other actors in the school system and society). The question about the intensity of decision-making powers in the listed domains and across the

different levels among individual teachers, among teachers collectively, the principal, and actors outside the school was raised (Wermke et al., 2019). In sum, German teachers felt significantly more involved in tasks concerning decision-making processes than their Swedish counterparts. The Swedish teachers expressed concern about control mechanisms that limited teacher autonomy. Teacher autonomy, however, presents itself differently in different domains. In the Swedish as well as in the German case, the classroom remains an autonomous domain of the teacher, even though the parents of the students have more influence on the teacher's activities in Sweden.

However, the study stated that the governance systems in Germany and Sweden are different: Sweden has an 'outcome-based' and Germany an 'input-based' governance system. In the institutional dimension (teaching profession as a group), the service dimension (practical dimension of the profession) and in the area of perceived autonomy of decision-making and control, Swedish teachers felt subject to external control and performance indicators resulting from a marketized school system, according to the study. In contrast, the German teachers in this study expressed that their work was determined by their professional constitution and legitimacy: their autonomy was defined by profession-related regulations and content (Wermke et al., 2019). The different governance systems of school could both explain and resolve teacher shortages.

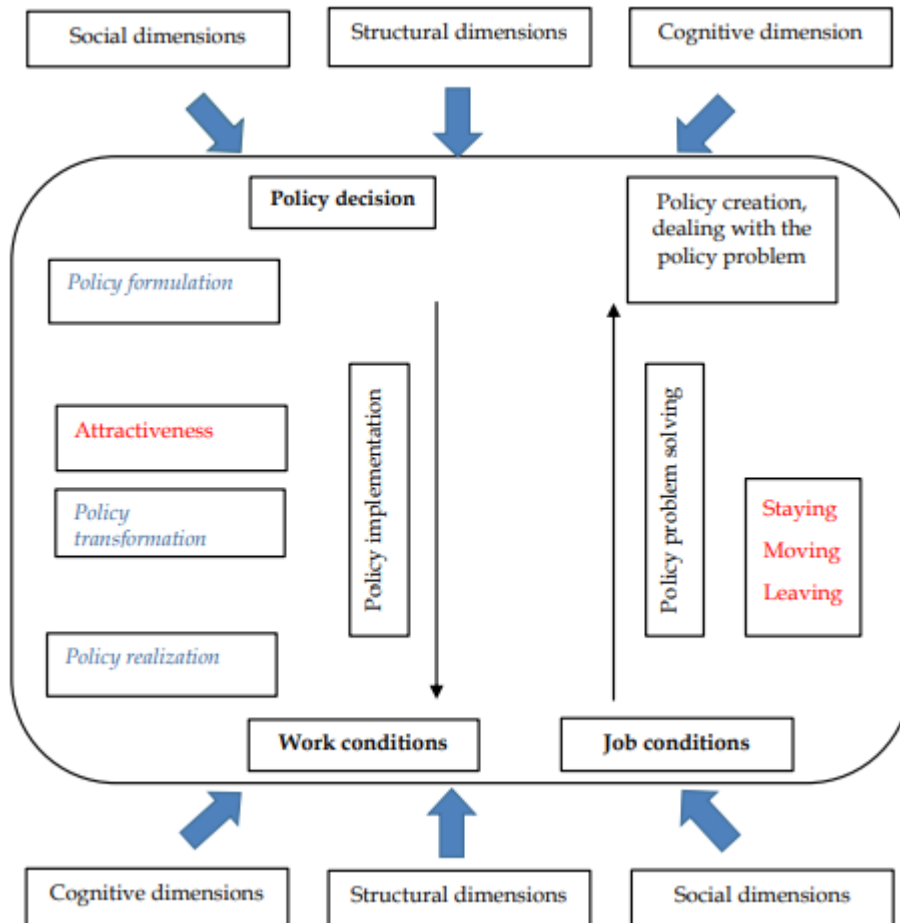
Teacher shortages are a multidimensional phenomenon involving a wide variety of domains. As the presented research approaches show, the difficulty lies in representing the macro-, meso-, and micro-level interrelationships, which are mutually constitutive and have (national and local) historical and sociocultural origins. The task of addressing this complexity is further exacerbated when international contexts and comparisons are addressed.

Theoretical Perspectives

Our interest in teacher shortage is based on a policy problem approach (i.e., the difference between a factual situation and the desired situation) as a theoretical starting point. Bacchi's model focusing on "what the problem is represented to be" (WPR) helps us to analyse the problem from a multi-actor perspective. According to Bacchi (2009), the WPR approach is a resource that facilitates a critical interrogation of public policies or policy areas. What one proposes to do about something, or how someone experiences something, reveals what one thinks is problematic (needs to be changed). Following this thinking, policies and their implementations contain implicit representations of what is considered to be the problem (problem representation). In order to understand and analyse the problem representation a number of questions are necessary. What is the problem represented to be by policy-relevant actors (i.e., those with a commitment to the problem)? What presuppositions or assumptions underpin the representation, and how has this representation of the 'problem' developed? What is not addressed in this problem representation? How and where has this representation of the problem been produced, disseminated and analysed? In this view, society is governed not through policies but through problematization, (i.e., how problems are constituted and/or understood). That is also correct for the question of teacher shortage.

It is important to stress that our use of the WPR model is not limited to a formal state or the perspective of authoritarian decision-makers, even if we recognize the importance of democratic decision-making on how policy problems are viewed or addressed, but from a broad policy actor approach. Our assumption is that policy is being constructed through both formal policy decisions by official representatives as well as by stakeholders acting, negotiating or facilitating policy so that it can be fulfilled, as we show in Figure 1.

Figure 1. A theoretical model for the analysis of teacher shortage



A policy can be understood as a course of action intended to accomplish some end. It is based on one or several ideas as well as institutional arrangements to realize these ideas (Heclo, 1972). Policies, whether distributive, redistributive or regulatory, can be conceived as the main product of a political system (Knill & Tosun, 2008), but policies also have to include implementation processes and demands for an adjustment to the local situation. Policymaking is a process characterized as including the aspects of (a) agenda setting, (b) policy formulation, (c) policy adoption, (d) implementation, and (e) evaluation (Hill, 2005). In this way, a policy can be viewed as a political or organizational idea or vision and its implementation. In our model above the concepts used are policy decision (agenda setting), (b) policy formulation, (c) policy transformation (policy adoption) and (d) policy realization (implementation). Differing concept names from Hill's are chosen because they represent our understanding of the policy process with regard to teacher shortage better. Our approach has similarities with Lipsky's (1980) insofar as teachers' close interactions with pupils or students and legal guardians request a day-to-day application of discretion in their assessment of issues and their role as policy interpreters in order to make policy work. In other words, teachers use the given policy-framework and have to carefully adjust it ("discretion") to the given situation in their everyday school work. This is also in line with Lindblom's (1959, 1979) argument about bounded rationality or incrementalism, in which policy is made and re-made endlessly due to the complexity of implementation or policy realization (the need for evaluation and recurring action for dealing with the policy and policy problem solving). We argue that understanding teacher shortage is a question of understanding the complexity of the context of the phenomena.

There is no simple answer to the question of how teacher shortages develop, but several interacting and complex factors seem to influence it. It is the result of a process that has continued for a long time. On the basis of the interviews conducted in the three countries participating in the WATS up project in the first research year and literature reviews, the

answers seem to include societal steering methods, a variety of reforms, changing conditions in schools and for teachers, the low status of the teaching profession, the quality of teacher education, and early exits from the profession. New Public Management (NPM) has changed the way in which schools are run, with marketization leading to increased segregation of pupils and reduced equity in the school system. At the same time, the conditions for working in schools have changed. The increased administrative burden on teachers, the increased teaching time, the incidence of work-related stress and health problems among existing teachers seem to have made it more difficult to recruit new teachers, to get former teachers to return to the profession as well as to get current teachers to stay. Thus, we can assume that several new societal and educational reforms have contributed to the teacher shortage by creating a situation of alienation in the profession among existing teachers with subsequent negative media headlines about school problems. This is not a favourable situation in which to address the issue of teacher recruitment. The introduction of NPM, which among other things was supposed to improve school results, seems to have created stress through ex-post monitoring. Demands for compliance, documentation, and formalized performance monitoring have increasingly replaced teachers' professional skills such as meeting each pupil in his or her learning processes, managing teaching content, and 'seeing' the child or student. Perceived or experienced stress has led many experienced teachers to leave the profession.

We argue that the representations of the complexity of causes and possible solutions to teacher shortage indicate a need for a broad-based approach in order to analyse the situation. It has to address both various internal and external challenges that schools and the teaching profession are facing. An analysis of structural (teacher education, societal reforms), social (media scrutiny, questioned legitimacy), and cognitive or emotional (work and job satisfaction) dimensions is needed to understand the current situation of teacher shortage. Based on the complexity of the problem we have created a theoretical and methodological model for empirical research in the area.

Principally, we argue that teachers can choose between four different options and that policy decisions affect their choice (see Figure 1). Teachers can choose to stay in their profession and in the school where they are working or leave. If they stay, they can participate in creating attractive work and job conditions in the school where they will continue with their work and also attract others to become teachers or they can move to other schools (in the same region or in other parts of the country) where they believe that the work and job conditions are better. With work conditions, we refer to work content (what do I teach about in my profession) and with job conditions we refer to the social status of the job (flexibility, pay, career opportunities; Dupriez et al., 2016). If they leave, they have decided that, presumably based on many different reasons, they cannot or will not continue to work as a teacher or at a school. This model is inspired by Hirschman's (1970) concepts of exit, voice, and loyalty. Loyalty is to be equated with staying in our approach, voice with attracting and moving, and exit with leaving. The concepts of staying—leaving and attracting—or moving are not dichotomous, either. They represent dimensions on a scale comprised more or less of each property. Staying and attracting imply both high work and job satisfaction (professional autonomy, professional legitimacy, work satisfaction), whilst moving and leaving imply low work and job satisfaction (de-professionalization, high workload, public scrutiny).

A Methodological Model

As we are to analyse the phenomenon of teacher shortage from an international comparative perspective, we need to construct a methodological model, which allows consideration of all three countries—Denmark, Germany, and Sweden. Thus, we start from a particular, idiosyncratic knowledge, without being able to detach the countries from their contexts, because they determine the object of study. Taking these requirements into account, we consider it adequate to use a case study with a comparative approach as a method for this research.

As Steiner-Khamsi (2016) also argued, a case study design is characterized by focusing on a phenomenon that is often difficult to distinguish from the context of the phenomenon. It provides an opportunity to analyse the reasons for the situation in-depth. This is precisely the main purpose of case study research, where a phenomenon is investigated within its real context due to the impossibility of separating the study variables from their context (Yin, 2003). In short, the choice of this method is based on a deep knowledge of the object of study of the countries taking into account the specifications of each environment. Thus, this method will allow us to analyse every country individually taking into consideration its idiosyncrasy. In addition, it also offers the opportunity to make comparisons through the parameters and indicators. The following advantages present other reasons for applying this method (Álvarez Álvarez & San Fabián Maroto, 2012):

It allows discovery of more subtle facts or elements that would not be taken into account using other research methods.

It exposes profound or unknown meanings, as well as guiding decision-making in relation to educational problems.

It extracts and provides more information from complex educational realities to understand internal processes and discover dilemmas and contradictions.

Delving into an experience provides concreteness, intensity, and detail regarding the subject of study.

It allows the use of numerous techniques in the collection and analysis of data, both quantitative and qualitative.

It allows and is necessary to triangulate the information collected to avoid researcher bias.

It is a very convenient method for individual and small-scale researchers.

However, two limitations of this method must also be taken into account: (a) the potential subjectivity of the researcher, which is present throughout the study, although this is not always considered a problem by the researchers, and (b) the impossibility of empirically generalizing the results obtained in the research. Conclusions from a multiple case study thus focus on analytical (theoretical) generalization (Yin, 2003).

Within the case studies, we find the single or multiple case studies, also called comparative cases (Ballester et al., 2017). The choice of the second option is determined by the focus of a study on a phenomenon (or several)—in our case the teacher shortage—of a certain number of cases (Germany, Sweden, and Denmark). Bogdan and Biklen (1982, seen in Rodríguez et al., 1996/1999) classify multiple case studies into modified analytic induction and constant comparison. In this research, we will choose the comparative approach, which will also allow us to compare the different cases with respect to the established comparison units, to have external references, and thus be able to propose and promote changes to optimize educational elements (Caballero et al., 2016).

As stated earlier in this text, the review of literature and the interviews conducted give no simple answers to the question of how the shortage of qualified teachers has developed. A number of interacting and complex factors seem to have influenced it, such as changing societal steering models, a variety of reforms, changing work conditions, the low status of the profession, the quality of teacher education, and early exits from the teaching profession.

Given the variation in the historical and current situation in the school sector of the participating countries, a model for analysing teacher shortage has to be extensive. It has to contain different indicators or challenges that might influence the current situation. The interacting and complex factors mentioned above have been summarized into three influential categories, divided into 8 parameters and 23 indicators in the model presented below (Table 1). Some of the indicators in our model are also represented in other studies on teacher shortage – such as in Darling- Hammond, Sutchter and Carver-Thomas (2018) or García and Weiss (2019). These studies point to teacher attrition and working conditions as the main causes of teacher shortages, but also mention tests and accountability pressures, lack of administrative support, and dissatisfaction with the teaching career, including lack of opportunities for advancement.

Table 1. A methodological model for empirical research

Category	Parameter	Indicator
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A) Education policy	A1) New public management	European policy guidelines
	A2) Reforms	Negative effects management* (Impact on) political reforms (Low) autonomy
	B1) De-professionalization	Standards Accountability, national exams Salary
B) Attractiveness of the teaching profession	B2) Work conditions	Workload (work hours) Flexibility Classroom climate, school environment
		Resources (e.g., ratio, special needs support)
		Social status
	B3) Status of the profession	Mistrust in teachers' professionalism
		Negative media scrutiny
C) The changing landscape of teaching	C1) New perspective of the teacher	Social circumstances
	C2) Teacher training	Teacher training guidelines (Insufficient) initial teacher training (practice training or content) (Lack of) mentoring program
		Expectations (initial vs. reality) Teachers' sense of preparedness
		Self-efficacy in teaching Job satisfaction
	C3) Teachers' perceptions	Why teachers remain

Note. *Effects of different governance philosophies on public activities (mainly negative effects of New Public Management)

The category "Education policy" (A) in Table 1 is represented by both a dominating public steering model (A1) that affects everyday life for teachers and continuous reforms (A2) that create flux and uncertainty in school development plans as well as in the school's organizational basis. The focus on national evaluation systems for schools and quality measurements challenges a focus on teachers' professionalism (Segerholm et al., 2019) and constant reforms may create uncertainty in when and how teachers have and can fulfil the expectations of the stated goals and caregivers.

This can potentially create frustration in fulfilling the ambitions one has as a teacher (voice) and can have an impact on both the attractiveness of becoming a teacher (exit in the interest of becoming a teacher) as well as staying in the profession (exit).

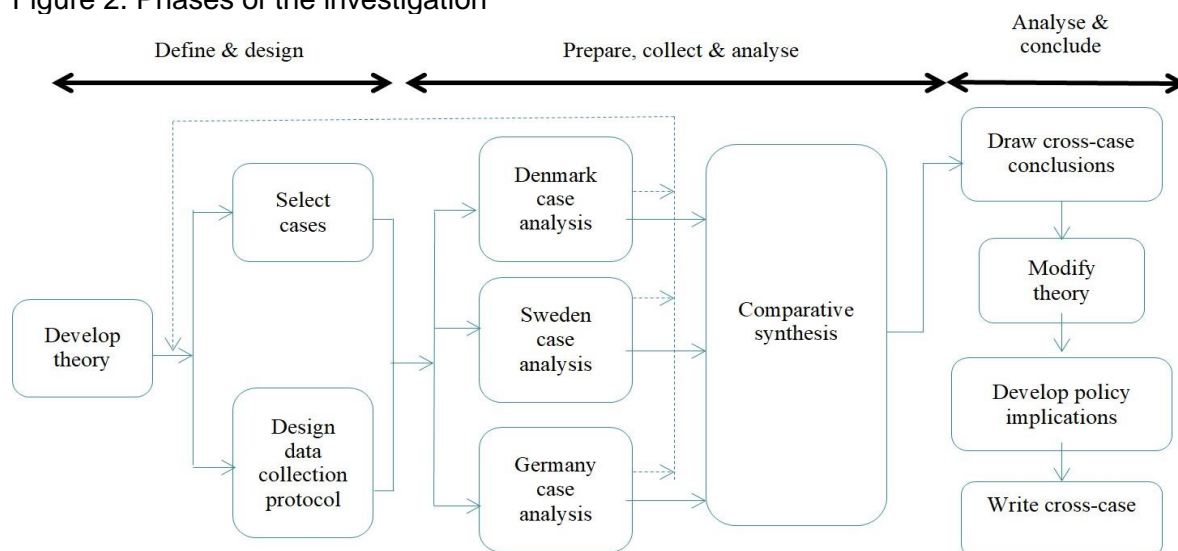
The category "Attractiveness of the teaching profession" (B) represents parameters of risk of de- professionalization (low autonomy) (B1) and unattractive work conditions (B2) (salary, workload, classroom climate). It also deals with risks concerning the attractiveness of being a teacher (B3) and might also lead to the teachers' legitimacy being challenged (criticism in media, among legal guardians, and pupils). This may affect both the attractiveness of becoming a teacher (attractiveness) as well as staying in the profession (exit).

The category "The changing landscape of teaching" (C) represents views of being or becoming a teacher. It also refers to a changing social climate (C1) where teachers have to manage different problems among pupils. The category also represents the challenges in how well-prepared teacher students are (C2/C3) when they start teaching after finishing their teacher training programs and how much support (mentoring) they are given when starting

their professional lives. However, this category also represents the opposite perspective. Even though the teacher shortage is a well- documented fact in the U.S., Europe, and many other countries in the world, there are many teachers who continue their work and show high job satisfaction. What are the main reasons for that—what are the success factors for staying in the profession (C3)? Identifying success factors can help to reduce teacher shortages through higher job satisfaction, and higher legitimacy for being a teacher, attracting former teachers back to school (loyalty).

We want to underline two aspects that we believe are relevant in the methodological and analytical approach. On the one hand, the proposed approach is based on a continuous process of testing and modifying the initially proposed theory, as reflected in Figure 2. The phases to follow in the study were proposed by Yin (2003). A first phase of definition and design that includes the development of the theory, or of a model in our case, the selection of cases and the design of the data collection protocol. A second phase of preparation, collection, and analysis, where the analysis of individual case studies as well as the comparative synthesis will be carried out. Finally, the third phase of analysis and conclusion where the conclusions between cases are obtained, the theory is modified, political implications are developed, and the report of the crossing of cases is prepared. In both the second and third phase, where the analysis takes place, there is a constant review, which leads to a modification of the theory (or the model), as mentioned above.

Figure 2. Phases of the investigation



Note. Elaborated from Yin (2003).

On the one hand, some of the categories, parameters and indicators are more relevant for some of the countries studied than for others. On the other hand, some are relevant to all countries. This is an important methodological conclusion. Due to the differences between the countries, a traditional comparative approach was not adequate in order to analyse the reasons for teacher shortage. That is why a multiple-case design (Stake, 1995) is recommended to take into account the complexity and understand the reasons.

Discussion

The purpose of this article is to present a model for the analysis and comparison of teacher shortages in three exemplary countries (Denmark, Germany, and Sweden). These three countries show large differences in the institutional structure of their educational systems as well as different types of challenges that schools have to face and address. The research questions were the following: What theoretical considerations are required to compare three different countries on the issue of teacher shortage? What methodological considerations are required to compare three different countries on the issue of teacher shortage? What categories and indicators are needed to describe and analyse teacher

shortage?

These three questions are addressed in our previous text. A theoretical starting point is presented in the article, where Bacchi's model of critical policy analysis has been important in addressing the issue of teacher shortage. Country comparisons in the area of teacher shortage are problematic if and when the countries studied exhibit large differences in their institutional educational structures and reported problems. Therefore, multiple case study designs are necessary for comparisons in order to provide descriptions of the problem (Yin, 2003; Steiner- Khamisi, 2016). Finally, we present a model for empirical studies in the field. The model for empirical studies that we propose in this article, including educational policy, the attractiveness of the teaching profession, and the changing landscape of teaching—that is, social, structural, and cognitive dimensions—takes our theoretical starting point into account: views on the teacher shortage may vary between policy-relevant actors in terms of both causes of the problem and possible solutions for it. National and local values of the teaching profession and their influence on teacher identities and related professional expectations need to be taken into account as they can conflict with each other (Czerniawski, 2008). Teacher shortages have to be studied using both qualitative and quantitative methods (Boe, 1996), and the reasons for it can be found in the different phases of the policy process (Hill, 2005). We argue that Hirschman's (1970) theoretical concepts of exit, voice, and loyalty cover the dimensions presented of being able to study teacher shortages described as attractiveness and staying, moving or leaving.

With these theoretical and methodological starting points, we believe that the issue of teacher shortage can be studied empirically. The next step in the WATS up project is to conduct empirical studies based on these assumptions. The importance of having trained and available teachers in the school system is obvious, especially due to the expectations that children, young people, and tutors (or guardians) have regarding the achievement of different life goals, and on the other hand, to provide labour for the economy and the educational system by democratizing responsibility.

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