

Important Aspects of Teacher Shortage. A Literature Review

Teacher shortage is reported to be a challenge worldwide. In a recent report, United Nations Educational, Scientific and Cultural Organization (UNESCO) reported the need for some 44 million new teachers to reach the Agenda 2030 targets. Attracting and retaining new teachers is difficult in relation to both geographical areas and in certain subjects, being a common challenge of many developed countries and is seen in many countries of the world. Teacher shortage and the lack of teachers has consequences as teaching in schools, students' learning and therefore the quality of education is affected. The overall aim of this literature review was to analyze peer-reviewed articles regarding teacher shortage from 2018-2023. The included articles of this literature review were peer-reviewed articles regarding teacher shortage from 2018-2023 which were identified using the Scopus database. Some 52 of articles met the inclusion criteria of this literature review. The articles represented 18 different countries all over the world. The methodologies of the studies also varied, for example, qualitative and quantitative studies. The content of the included articles was thematically encoded and categorized by the described a) reasons behind, b) area/subject c) and discussed solutions. The themes were identified inductively; they were strongly linked to the data, and the steps of qualitative content analysis were followed to identify these themes. The overall conclusion is that teacher shortage is multifaceted and complex. There are many reasons behind teacher shortage and there are many aspects that interact on several different levels. In order to alleviate teacher attrition and promote teacher recruitment and retention, collective initiatives by many of the stakeholders involved will be necessary.

Keywords: *Professional development, qualitative content analysis, research review, teachers, teacher shortage*

Introduction

Teacher shortage appears to be a challenge worldwide. In a recent report, United Nations Educational, Scientific and Cultural Organization UNESCO reports the need for some 44 million new teachers to reach the Agenda 2030 targets (UNESCO, 2024). Attracting and retaining new teachers is difficult in relation to both geographical areas and in certain subject areas. Teacher shortage is a common challenge for many developed countries (European Commission, 2018). Teacher shortage is seen in many countries (Federičová, 2020; Håkansson Lindqvist, Boström & Gidlund, 2022; O'Doherty & Harford, 2018). Teacher shortage has consequences as teaching in schools, students' learning and therefore the quality of education. For example, UNESCO (2024) reports on the effects of teacher shortage on achieving the Sustainable Development Goal (SDG) 4 in Education.

Aim and Research Questions

The aim of this paper is to study teacher shortage through conducting a literature review in order to analyze peer-reviewed articles regarding teacher shortage from the period of 2018-2023. The following questions were posed: 1) How is teacher shortage described in the current literature? 2) How do the emerged themes provide insight in teacher attrition, teacher recruitment and teacher retainment?

This paper reviews teacher shortage and possibilities to alleviate teacher attrition, and to promote teacher recruitment and retainment. This involves attracting more people into teaching and keeping them in the profession by identifying the proposed solutions to teacher shortage. This paper contributes to previous research on teacher shortage, as proposed solutions to teacher shortage is essential knowledge so that political and policy initiatives can effectively strive towards solutions of the current issue of teacher shortage internationally.

Background

Teacher shortage is not only a national issue in specific countries. The current shortages are to be seen in many countries, but it differs from country to country, area to area, and of different subject areas, which has been announced in several countries (European Commission, 2015; Eurydice, 2018). The shortage is predicted to get worse as the student population increases, less students go into teacher training, or more qualified teachers leave the teaching career. These shortages are often named to depend on the relatively low pay of teachers (Dee & Goldhaber 2017; Aldeman 2015; Ingersoll 2011; Hutchings 2011; Dolton, Tremayne, & Chung 2003), low status, poor career opportunities and heavy workloads in schools (Borman & Dowling 2017; Hayes 2017; Hobson, Giannakaki, & Chambers 2009).

Although teacher shortage is currently discussed immensely, these shortages are not new. There has been reported a shortage in specific subject areas, such math and science, since at least the 1950s, and in special education there has been a continual shortage since the 1960s (Ingersoll & Perda, 2010; U.S. Department of Education Office of Postsecondary Education, 2017).

Teacher shortage is particularly urgent in subject areas such as Science, Technology, Engineering, and Mathematics (STEM). Special Education Needs (SEN), and bilingual education (Darling-Hammond et al., 2018). The same is reported high-poverty and high-minority areas, such as high-risk inner cities schools or schools in rural areas (Loeb, Darling-Hammond, & Luczak, 2005; Darling-Hammond, 2010; Adamson & Darling-Hammond, 2012).

Other areas reported for teacher shortage are teachers of ethnic minority and their gender (Aldeman, 2015; Dee & Goldhaber, 2017). Reported in the US, but also seen in the rest of the world, are schools where the majority of students are of colour, such as Black, Hispanic, and Asian, the majority of the teachers are not of

1 the race/ethnicity as the majority of students (NCES, 2020) which involves an
2 imbalance for students.

3 Furthermore, teaching appears to be less attractive to males than females. The
4 teaching profession has been reported as one of the most gender-segregated
5 professions among the countries participated in the Teaching and Learning
6 International Survey (TALIS) in 2012 (OECD, 2014). Thus, in regard to teacher
7 shortage, the gender issue may also involve a challenge.

8 9 10 **Methodology/Materials and Methods**

11
12 Descriptive research synthesis relies on explicit search strategies and on
13 unambiguous criteria for selecting pertinent, high-quality studies. It is systematic,
14 explicit, comprehensive, and reproducible, and it relies on knowledge, evidence,
15 and experience to identify and interpret similarities and differences in the studies'
16 purposes, methods, and findings (Fink 2005).

17 18 **Identification**

19
20 This research synthesis involved multiple phases to identify the studies dealing
21 with the research questions, and the recommendation of PRISMA statements were
22 followed (PRISMA, 2020). An initial identification of potential studies was
23 conducted via an advanced keyword search of the SCOPUS database in September
24 2023, regarding teacher shortage from 2018-2023. SCOPUS was chosen because it
25 is the world's largest abstract and citation database of peer-reviewed research
26 literature (Elsevier, 2023) with over 7,000 publishers and includes more than 91
27 million records, and 17 million authors from different countries. Firstly, a broad
28 search using the keywords from the research questions was used to establish the
29 main outline of the study. Only English-language, peer-reviewed articles from the
30 social sciences were included. This broad search resulted in too many articles (94),
31 which led to a series of more detailed searches, starting with an initial sift on the
32 titles and keywords of the articles found in the broad search.

33 The key words, and their thesaurus terms, used for each search were “Teacher
34 Shortage/s”; “Teacher Recruitment”; “Teacher Retention” and “Teacher Attrition”.

35 36 **Screening**

37
38 The combination of the terms “Teacher Shortage/s” resulted in 42 sources;
39 “Teacher Recruitment” resulted in 18 sources; “Teacher Retention” resulted in 13
40 sources; “Teacher Attrition” resulted in 8 sources; and “Teacher Education” and
41 “Teacher Preparation” resulted in 12 sources. To determine whether the studies'
42 findings were comparable and compatible, the following inclusion criteria were
43 used in the study: 1) the article focused on teacher shortage, and 2) contained
44 empirical data.

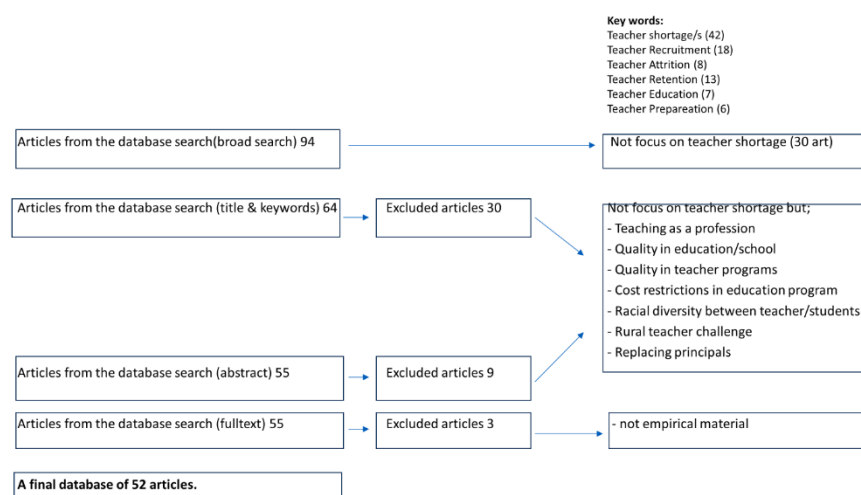
1 The broad search returned 93 articles. After reading the titles and keywords, 30
2 articles were rejected because they did not focus specifically on teacher shortage.
3 For example, places focus on teaching as a profession or quality in schools.

4 **Eligibility**

6 After this first filtering, 64 articles remained, and after an additional abstract
7 screening it led to a database of 55 articles. Articles on other areas than teacher
8 shortage and those focuses on how to work with efficient specific subjects, or
9 teacher programs were excluded. For this research synthesis, articles were included
10 only if they dealt with teacher shortage.

11 After reading the articles carefully, and in their entirety, three were rejected
12 because they did not satisfy the selection criteria for this review question, as their
13 empirical data focused on presentation of approaches for specific subjects. Articles
14 that were purely discussions with researchers were also excluded. This led to a
15 final database of 52 studies as illustrated in Figure 1.

16 *Figure 1. Overview of the article review process*



19 Thus, the empirical base this study is the 52 studies which were the result of
20 this process.

23 **Inclusion Criteria**

24 Because there is a lack of consensus on what comprises good-quality
25 qualitative research and what formal criteria should be used (Boaz & Sidford,
26 2006), it is important to account for the criteria used in any research synthesis. All
27 included articles in this research synthesis were peer reviewed and published in an
28 international scientific journal.

29 A synthesis can differ based on what counts as data from the primary studies,
30 and what not (Major & Savin-Baden, 2010). This research synthesis considers any
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1 data presented in the articles that are relevant to the aim of this paper. The themes
2 that run across the included articles were identified inductively; they were strongly
3 linked to the data. The steps of constructionist thematic analysis were followed to
4 identify these themes (Braun & Clarke, 2006). Throughout the analytical process,
5 the included articles in their entirety served as points of reference when deeper
6 understanding was needed to define the themes.

7 In this study, the researchers independently developed a list, created a
8 summary of the articles, and then discussed the main ideas found during our
9 examination. The result was the creation of a final list of articles divided into
10 proposed coding categories, themes, and related strategies. These coding categories
11 underwent numerous revisions, as did the themes and sub-themes, in discussion
12 between the researchers.

13 14 **Sample**

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16 The included articles of this literature review were peer-reviewed articles
17 regarding teacher shortage from 2018-2023 in Scopus. The literature review was
18 conducted to investigate the serious situation in the world today regarding different
19 teacher shortages in different countries. Some 52 articles met the inclusion criteria
20 of this literature review. The articles represent 18 different countries all over the
21 world. These countries represented in the articles were: Australia, Belgium,
22 England, Germany, India, Ireland, Israel, Kuwait, New Zealand, Oman, South
23 Korea, Sweden, Switzerland, Thailand, The Netherlands, Uganda, United States
24 (US) and Zambia. The methodologies of the studies also varied, for example,
25 qualitative and quantitative studies.

26 The content of the included articles was thematically encoded and categorized
27 by the described a) reasons behind, b) area/subject c) discussed solutions.

28 29 30 **Results**

31
32 In this section, the results are presented. First some descriptive statistics are
33 presented regarding the articles reviewed. Thereafter, the results are presented in
34 line with the themes which emerged. The findings indicate that many of the articles
35 analysed report on teacher attrition, teacher recruitment and teacher retention.

36 37 **Descriptive Statistics of the articles**

38
39 As noted above, many countries were represented among the articles. The
40 distribution of the countries is presented in Table 1.

1 *Table 1.* Distribution of countries in the 52 articles reviewed.

Continent	Countries	Number of articles
Africa	Zambia, Uganda	2
Asia	India, Israel, Kuwait, Oman, South Korea, Thailand	6
North America	United States (US)	33
Europe	Belgium, England, Germany Ireland, Sweden, Switzerland, the Netherlands	7
Oceanien	Australia, New Zealand	3
Global	International	4

2
3 A few of articles had an international perspective. Other articles represented
4 several countries. In total some 18 countries were represented.

5 As noted above, the articles were published between 2018-2023. The
6 publishing year of the articles reviewed is illustrated in Table 2.

7
8 *Table 2.* Articles per year published.

Year	Number of articles
2018	5
2019	11
2020	3
2021	6
2022	17
2023	10
In total	52

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10 The largest number of articles was published in 2022 (17), followed by 2019
11 (11). The year 2020 (3) had the lowest figure of published articles. In regard to the
12 methods chosen in the articles, the articles were reviewed in regard to method. The
13 methods in the articles reviewed are illustrated in Table 3.

14
15 *Table 3.* Method in the articles reviewed.

Method	Number of articles
Quantitative	21
Position papers, literature, and policy reviews	15
Qualitative	9
Mixed methods	7
In total	52

16
17 As presented in the table above, most of the articles employed quantitative
18 method (21). Many of the articles were position papers, literature reviews and

1 policy reviews (15). Qualitative method (9) and Mixed methods (7) were more or
2 less on the same level.

4 **General Themes related to Teacher Shortage**

6 Synthesizing the research, in research reviews involve identifying and
7 combining themes and categories across the included studies in order to create a
8 new meaning (Major & Savin-Baden, 2010) of teacher shortage. In this section, the
9 findings regarding *the reasons for teacher shortage* as well as how teacher shortage
10 is reported as being related to *subject-specific or related to specific areas*.

12 **Reasons for Teacher Shortage**

14 In all the included articles of this review, the findings indicated that the
15 reasons for the world-wide teacher shortage are *low salary* (e.g. Almutawa & Koul,
16 2022; Dos Santos, 2021; Sutchter, Darling-Hammond & Carver-Thomas, 2019;
17 Wiggan, Smith, & Watson-Vandiver, 2021) *heavy workload* (e.g. Almutawa &
18 Koul, R. 2022; Heffernan et al., 2022; Toropova, Myrberg & Johansson, 2021),
19 *issues of health and wellbeing* (e.g. Almutawa & Koul, 2022; Dos Santos, 2021;
20 Heffernan et al., 2022; Koh. 2022; Toropova, Myrberg & Johansson, 2021), and
21 *low career opportunities* (e.g. Al-Busaidi & Pertanika, 2019; Almutawa & Koul,
22 2022; Bill et al., 2022; Carothers, Aydin & Houdyshell, 2019; Heffernan et al.,
23 2022; Lee, Kang & Park, 2019; Wiggan, Smith, & Watson-Vandiver, 2021). The
24 findings reported above as reasons for teacher shortage can be found in most, if not
25 all, of the articles of this review.

27 **Teacher Shortage related to Subject-specific or related to Specific Areas**

29 In the included articles, teacher shortage was also seen to be related to
30 subjects, such as different subject areas (e.g. See et al., 2022), STEM (e.g. Love &
31 Love, 2023; Han, 2023; Peyton, van Dijk & Mason-Williams, 2023; Reinsfield &
32 Lee, 2022). Other subject areas were seen in Special Education Needs (SEN) (e.g.,
33 Peyton, van Dijk & Mason-Williams, 2023) and Bilingual teaching, (e.g. Burke,
34 Ceo-DiFrancesco, 2022; Hernández, Alfaro & Martell, 2022; Peyton, van Dijk &
35 Mason-Williams, 2023; Sada & Ward. (2022). Other forms of teacher shortage
36 reported on were related to geographical areas, such as urban or rural areas,
37 (Pholphirul, Rukumnuaykit & Teimrad, 2023; Seeliger & Håkansson Lindqvist,
38 2023). Finally, teacher shortage was also seen and discussed in relation to *ethnicity*,
39 (e.g. Goodwin, 2023; Sada & Ward, 2022) or *gender*, (e.g. See et al., 2022) of the
40 teachers in shortage.

42 **Proposed Solutions**

44 In the next sections, themes on the proposed solutions of teacher shortage, that
45 run across the included articles were identified, and will be presented separately:

1 *working conditions and job satisfaction; school policy and school administration;*
2 *teacher education and side-entrances and important stakeholders.*

4 Working Conditions and Job Satisfaction

6 As a reason for teacher shortage teachers' working conditions and job
7 satisfaction are frequently mentioned. The negative effects of teacher shortage are
8 linked to teachers' job satisfaction and working conditions, both in the eyes of them
9 self and in the eyes of others. In order to strengthen teacher retention and reduce
10 teacher attrition, the included articles proposed a change in the organizational
11 climate and culture of schools.

12 It is stated that teachers cannot cope with heavy workloads and emotional
13 stress (Heffernan et al., 2022). Therefore, there must be clear and strong
14 investments in teacher salary, and higher status for the teaching profession
15 (Wiggan, Smith, & Watson-Vandiver, 2021; Peytonet al., 2021) in order to gain
16 higher job satisfaction for teachers (Toropova, Myrberg & Johansson, 2021). There
17 is time to not only focuses on limitations but protecting the core work of teachers,
18 and strengthen it (Pendola et al., 2023). Covid has, though, strengthen the respect
19 and awareness of teacher conditions (Bill et al., 2022; Dos Santos, 2021).

20 It is important is to focus on teacher students' career and interest (van Rooij,
21 Fokkens-Bruinsma, & Goedhart, 2020; Al-Busaidi & Pertanika, 2019), but also
22 gender differences (Macias & Stephens, 2019). The job satisfaction for teachers is
23 even lower in schools with low income and/or minority pupils (Geiger, &
24 Pivovarova, 2018). Furthermore, Almutawa & Koul (2022) claim that classroom
25 goals and structures are the most important to teachers' job satisfaction.

27 School Policy and School Administration

29 To strengthen teacher retention and reduce teacher attrition efforts must be
30 carried out on school policy and school administration levels. Accordingly, as
31 reported in the articles, no teacher, nor school alone can solve the world-wide
32 teacher shortage. Teacher shortage is created by government policies such as
33 selection system, education and training leaving age, and school funding system
34 (See & Gorard, 2020). Administration should, therefore, develop a mutual
35 relationship between school leaders and teachers in order to collaborate more
36 strategically (Burke & Ceo-DiFrancesco, 2022), and support principal leadership
37 and organizational management (Castro, 2023).

38 School administration and teacher education should also design a clear support
39 system for intern teachers to retain teachers (Maruca & Zapata, 2022; O'Doherty &
40 Harford, 2018). Policymakers should, in other words, take a distinct long-term
41 approach to establish systematic and large-scale strategies to create a more durable
42 and a more stable profession (Sutcher, Darling-Hammond & Carver-Thomas,
43 2019; Van den Borre, Spruyt, & Van Droogenbroeck, 2021).

44 To deal with the shortage of bilingual teachers and teachers of colour, school
45 administration should prepare school leaders to support teachers of color

1 (Goodwin, 2023). They should also develop critically conscious bilingual educators
2 (Hernández, Alfaro, & Martell, 2022) to teach pupils of different ethnicity.

3 When it comes to shortage in rural areas educational leaders should call for
4 additional legislative and policy support for rural teachers (Mitchell, Hampton, &
5 Mambwe, 2022). District leaders' actions should be based on the relative
6 conditions of urban or rural contexts. (McHenry-Sorber & Campbell, 2019), and
7 school administrative strategies should be used to reduce teacher shortage in high-
8 need subjects, such as, SED in rural schools and also to critically evaluate them
9 (Brownell, Bishop & Sindelar, 2018). In rural areas school administrator should not
10 letting teachers have to teach subjects they are not specialized to, and not mixed
11 aged levels in same classes (Pholphirul, Rukumnuaykit & Teimrad, 2023). There
12 should not be allowed with quick fix for rurality exams (Hollo, Floyd & Brigandi,
13 2019), instead policy makers and politicians need to make efforts to increase task
14 returns and benefits (Lee, Kang & Park, 2019). Furthermore, attention school
15 administration should lie on policies to both recruit, and retain teachers (Darling-
16 Hammond & Podolsky, 2019).

17 18 Teacher Education and Side-entrances

19
20 Teacher recruitment by teacher education is proposed to be one entry towards the
21 downward trend of teacher shortage. Teacher education in many countries has
22 implemented creative recruitment strategies in various areas.

23 One suggested solution to increase the recruitment of teachers, are to offer
24 more placement and internship in teacher education programs. Teacher education
25 can put positive emphasis on hands-on education in internship schools and mentors
26 (Pauwels et al., 2022). Prior teaching and learning experiences for teacher students
27 (Madden et al., 2022) has shown to be effective, since early teaching experiences
28 are positive to attract students to teacher programs and higher their perception of
29 teaching as a career – especially culturally and ethnically diverse students
30 (Carothers, Aydin & Houdyshell, 2019). 'Grow Your Own' (GYO) in school
31 district plans for increase participants in teacher programs (Hamman, Matteson &
32 Nguyen, 2023). Support apprenticeship by GYO, in teaching to recruit and prepare
33 teacher of colour and bilingual educators (Heller, 2021).

34 The mitigation of the teacher shortage within specific subjects is discussed in
35 various, and similar ways in the articles. Recruitment and retention of bilingual
36 teachers is needed (Sada & Ward, 2022), and increased teacher programs for
37 bilingual teachers are asked for (Jimenez-Silva, Ruiz & Smith, 2022) and should
38 therefore be taken into account. Also, when it comes to SEN teachers, teacher
39 education needs to prepare students for behavioral problems to avoid teacher
40 attrition (Koh, 2022). There are though different perceptions between teachers and
41 school administrator about the needs and roles of SEN teachers (Hagaman &
42 Casey, 2018). Recruitment strategies of SEN teachers and teacher preparation
43 programs are needed (Chamberlin-Kim, Tarnay & Wells, 2019). Teacher education
44 programs should invest more for SEN-teachers in high shortage areas (Peyton et al.,
45 2021), with the purpose to increase recruitment of teachers working with sensory

1 impairments and other SEN in rural and remote schools – and to keep them there
2 (Davis, Pogrund & Griffin-Shirley, 2020).

3 Another issue for teacher education to elaborate is imbalance between
4 geographical areas within a country. The production of undergraduate education of
5 high-needs areas should expand (Peyton, van Dijk, & Mason-Williams, 2023). The
6 importance of mobility of teacher education between states to provide teacher in
7 rural areas (Seeliger & Håkansson Lindqvist, 2023) since the distance from teacher
8 educational programs in rural areas cause shortage of teachers there (Goldhaber et
9 al., 2020).

10 To recruit students to teacher education programs teacher education programs
11 must be more sought for and more attractive. Teacher education must adapt
12 learning programs to the students' learning and interests (Van den Borre, Spruyt, &
13 Van Droogenbroeck, 2021; Reinsfield & Lee, 2022). Interest and hands-on hobbies
14 related STEM education as recruiting factor to teacher programs (Love & Love,
15 2023). The importance of tailor-made teacher programs to attract unemployed
16 academics to teaching (Ramot & Donitsa-Schmidt, 2021). Also, addressing
17 individuals who would focus on building effective relationships with pupils in
18 urban, high need schools (Wronowski, 2018). As a short-term solution for teacher
19 shortage, is that teachers can be certified to teach other subjects by an exam, even
20 though this is not advised (Hollo, Floyd & Brigandi, 2019). Non-specialist teachers
21 are being used from other learning areas than they are educated in (Reinsfield &
22 Lee, 2022). Even the system of contract teachers may solve teacher shortage in
23 short terms, but that have major impact on teachers working conditions. This quick
24 fix, often due to budget, will lead to demoralization and disempowerment of
25 educated teachers (Apat & Swain, 2023).

26 **Important Stakeholders**

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29 Other themes that emerged among the proposed solution for teacher shortage
30 in the reviewed articles were also seen as important. Here important stakeholders
31 were reported: *Teacher unions* and *encouraging parents*.

32 **Teacher Unions**

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35 Teacher unions are important stakeholders for teachers in their profession. To
36 retain teachers of both genders, teacher unions should address female teachers in
37 the same manner as they address male teacher in various matters and issues. There
38 is a difference in the way teacher unions focus mostly on male teachers, which has
39 impact on the retention of teacher of both genders (Han, 2023).

40 **Encouraging Parents**

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43 Encouraging parents are also important stakeholders. When it comes to
44 recruitment at an early stage, pupils are more likely to consider teaching as a future
45 profession when parents, family members, community and others encourage them

1 to become teachers. This is especially true if pupils believe that expectations are
2 reasonable (Christensen et al., 2019). Parents' encouragement of their children to
3 become teachers is also depending on the encouragement of people outside the
4 family (Christensen et al., 2022; Davis, Pogrund & Griffin-Shirley, 2020). It is also
5 stated that rural parents and rural teachers influence each other and increase the
6 retention and engagement interchangeably (Arinaitwe & Corbett, 2022).

7 8 9 **Results in Summary**

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11 In summary, the reason for world-wide teacher shortage are low salary heavy
12 workload issues of health and wellbeing and low career opportunities. Subject-
13 specific or related to specific areas. Possible solutions were seen to be improving
14 working conditions and job satisfaction; school policy and school administration
15 which supports teachers; attractive teacher education and possible side-entrances
16 and the support of important stakeholders.

17 18 19 **Discussion**

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21 The aim of this paper was to study teacher shortage through conducting a
22 literature review in order to analyze peer-reviewed articles regarding teacher
23 shortage from the period of 2018-2023. The following questions were posed: 1)
24 How is teacher shortage described in the current literature? 2) How do the emerged
25 themes provide insight in teacher attrition, teacher recruitment and teacher
26 retainment?

27 In answering the first research question, many themes emerged which present
28 challenges which lie behind the current status of teacher shortage. Issues regarding
29 low salary, heavy workload, health and well-being and low career opportunities, as
30 reported in this study, are well in line with previous policy (European commission,
31 2015; Eurydice, 2018) and research Federičová, 2020; Håkansson Lindqvist,
32 Boström & Gidlund, 2022; O'Doherty & Harford, 2018). These issues are
33 frequently reported in the literature in regard to the relatively low pay of teachers
34 (Dee & Goldhaber 2017; Aldeman, 2015; Ingersoll 2011; Hutchings 2011; Dolton,
35 Tremayne, & Chung 2003), low status, poor career opportunities and heavy
36 workloads for teachers in schools (Borman & Dowling 2017; Hayes 2017; Hobson,
37 Giannakaki, & Chambers 2009). International trends point toward an increase in
38 teacher shortage as the number of children entering the educational system
39 increases, teachers retire and leave the profession (UNESCO, 2024). Thus, these
40 issues are strongly related to teacher attrition. Further, these issues are also relevant
41 in regard to teacher retainment. As older teachers leave the profession, new teachers
42 will need support by experiences teachers when they enter the profession. This
43 support will be provided by in-service teachers in the educational system.
44 Retainment of these teachers will be key to support new teachers in their first years
45 of work.

1 In this study, new entries in teacher education are proposed to be one step
2 towards the downward trend of teacher shortage. Teacher education in many
3 countries has implemented creative recruitment strategies in various areas, of which
4 may be both durable and effective. These initiatives will be important to mitigate
5 the challenges related to gender (Aldeman, 2015; Dee & Goldhaber, 2017), ethnic
6 aspects (NCES, 2020) and geographical aspects (Darling-Hammond, 2010;
7 Adamson & Darling-Hammond, 2012). New paths in teacher education for male
8 teachers and teachers of ethnic minorities as well as special initiatives to support
9 STEM, SED and bilingual education may also have impact on turning the trend of
10 teacher shortage. The attractiveness of teacher education for new teacher students,
11 both younger and more experienced academics who choose a new path in life in
12 teaching, will also be important for successful recruitment of new teachers in the
13 teaching profession. As also seen in this study, school leaders, school organizers,
14 teacher unions and encouraging parents will also be important. These efforts
15 together will most likely support teacher recruitment.

16 In summary, the results of this study show that teacher shortage is a challenge
17 in many countries. Further, the results of this study could be interpreted as a call for
18 action in each specific country context. As the reasons for teacher shortage are well
19 represented in the research, it will be important to find new ways to collaborate
20 internationally to disseminate new research on possible solutions to teacher
21 shortage and to identify sustainable efforts and initiatives. If pupils are to receive
22 quality education, in line with the policy goals set by UNESCO (2024), further
23 collaboration regarding how to take on the challenges of teacher attrition, and at the
24 same time promote teacher recruitment and retention will be necessary in order to
25 alleviate teacher shortage.

26 27 28 **Conclusions** 29

30 The overall conclusion of this study is that teacher shortage is multifaceted,
31 complex and context based. Moreover, all of the reasons for teacher shortage and
32 the possible solutions interact. Implications for practice involve how different
33 stakeholders can support teachers as professionals. This may involve efforts in
34 policy to increase salaries, prioritising teachers core work with teaching and
35 learning through a shift from administrative work to planning activities for pupils'
36 learning. Efforts to support teachers' status and to support pupils to enter the
37 teaching profession will also be of importance. Teachers are employed by schools,
38 and schools are submitted to local and national levels to carry out their teaching
39 mission. Flexible and strengthened organizational management on local and
40 national level may support these efforts. With this in mind, the results of this study
41 included proposed changes of school policy and school administration levels on
42 different levels. Here, it is most likely that a joint effort will be necessary, in which
43 governments, school organisers, school leaders, teacher unions, encouraging
44 parents and society together take on the challenges of teacher shortage to ease the
45 impact of teacher shortage on pupils' education.

Limitations and Future Research

In this literature review, the main limitations are found in the search of only one database. On the one hand, this could mean that articles which have met the search criteria were not identified in this study. On the other hand, the Scopus database was chosen for the high level of quality in this database. In the light of these limitations, the sample of articles has provided an updated picture of the challenges in teacher shortage as well as solutions. Future research could a wider and more in-depth literature involving several databases to acquire a deeper understanding of teacher shortage.

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