Athens Journal of Education - Volume 12, Issue 3, August 2025 – Pages 383-400

Important Aspects of Teacher Shortage in Schools. A Literature Review

By Marcia Håkansson Lindqvist[*] & Ulrika Gidlund[±]

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 in schools to reach the Agenda 2030 targets. Attracting, recruiting 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 aim of this paper was to study teacher shortage in schools through a literature review in order to explore the causes of the teacher shortage described in current literature and understand these causes based on teacher attrition, teacher recruitment and teacher retention. 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 chosen methods 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 in schools 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

[*]Associate Professor in Education, Department of Education, Mid Sweden University, Sweden.
[±]Senior Lecturer, Department of Education, Mid Sweden University, Sweden.

https://doi.org/10.30958/aje.12-3-2 doi=10.30958/aje.12-3-2

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 in schools through conducting a literature review in order to analyse peer-reviewed articles regarding teacher shortage from the period of 2018-2023. The following questions were posed: 1) How are the causes of the teacher shortage described in current literature? and 2) How do the reasons that have emerged for teacher shortage give an understanding of teacher attrition, teacher recruitment and teacher retention? 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. Acknowledging that the educational systems differ greatly from each other, 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). Further low status, poor career opportunities and heavy workloads in schools (Borman & Dowling 2017; Hayes 2017; Hobson, Giannakaki, & Chambers 2009) are also important aspects which have impact on teacher shortage.

Although teacher shortage is currently discussed immensely, these shortages are not new. There has been reported a shortage in specific subject areas, such as 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 the race/ethnicity as the majority of students (NCES, 2020) which involves an imbalance for students.

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

Methodology/Materials and Methods

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

Identification

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

The key words, and their thesaurus terms, used for each search were: *"Teacher Shortage/s"; "Teacher Recruitment"; "Teacher Retention"* and *"Teacher Attrition"*.

Screening

The combination of the terms "Teacher Shortage/s" resulted in 42 sources; "Teacher Recruitment" resulted in 18 sources; "Teacher Retention" resulted in 13

sources; "Teacher Attrition" resulted in 8 sources; and "Teacher Education" and "Teacher Preparation" resulted in 12 sources. To determine whether the studies' findings were comparable and compatible, the following inclusion criteria were used in the study: 1) the article focused on teacher shortage, and 2) contained empirical data.

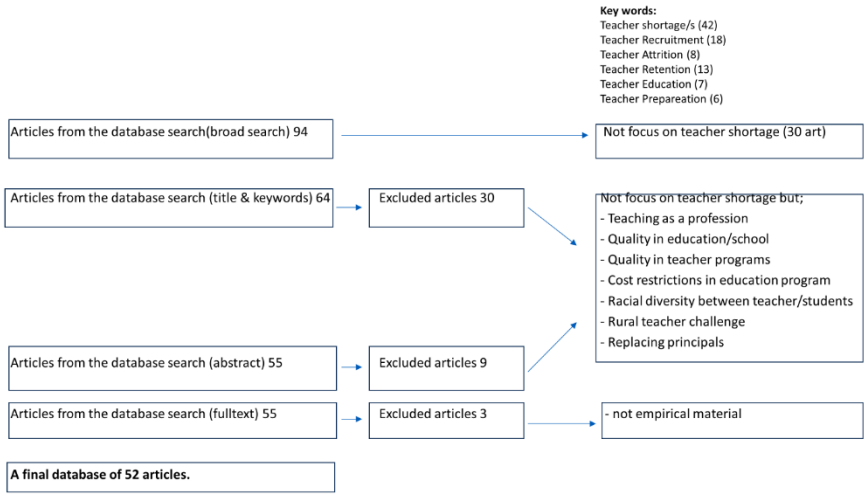
The broad search returned 93 articles. After reading the titles and keywords, 30 articles were rejected because they did not focus specifically on teacher shortage. For example, these articles placed focus on teaching as a profession, quality in schools or school leaders' work which could considered to be out of scope for this literature review.

Eligibility

After this first filtering, some 64 articles remained, and after an additional abstract screening it led to a database of 55 articles. Articles on other areas than teacher shortage and those articles which focused on how to work with efficient specific subjects, or teacher programs were excluded. For this literature review, articles were included only if they dealt with teacher shortage specifically.

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

Figure 1. Overview of the Article Review Process



Thus, the empirical base this study is the 52 articles which were the result of this process.

Inclusion Criteria

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

Sample

The included articles of this literature review were peer-reviewed articles regarding teacher shortage from 2018-2023 in Scopus. The literature review was conducted to investigate the serious situation in the world today regarding different teacher shortages in different countries. As noted previously, some 52 articles met the inclusion criteria of this literature review. These articles represented 18 different countries such as: Australia, Belgium, England, Germany, India, Ireland, Israel, Kuwait, New Zealand, Oman, South Korea, Sweden, Switzerland, Thailand, The Netherlands, Uganda, United States (US) and Zambia. The methodologies of the studies also varied, for example, qualitative and quantitative studies.

Data Analysis

In this study, the authors independently developed a list and created a summary of the articles, and then discussed the main ideas found during the synthesis. A synthesis can differ based on what counts as data from the primary studies, and what does not (Major & Savin-Baden, 2010). This synthesis considers any data presented in the articles that are relevant to the aim of this paper. The result was the creation of a final list of articles divided into proposed coding categories, themes, and related strategies. These coding categories underwent numerous revisions, as did the themes and sub-themes, in discussion between the researchers. The themes that ran across the included articles were identified inductively and were strongly linked to the data. The steps of thematic analysis were followed to identify these themes (Braun & Clarke, 2006). Throughout the analytical process, the included articles in their entirety served as points of reference when deeper understanding was needed to define the themes. In line with Braun and Clarke (2006), the articles were read and re-read in a reflective process, first individually and thereafter discussed between the authors. The content of the included articles was thematically encoded and categorized by the described a) reasons behind, b) area/subject c) discussed solutions.

Results

In this section, the results are presented. First some descriptive statistics are presented regarding the articles reviewed. Thereafter, the results are presented in

line with the themes which emerged. The findings indicate that many of the articles analysed report on teacher attrition, teacher recruitment and teacher retention.

Descriptive Statistics of the Articles

As noted above, many countries were represented among the articles. The distribution of the countries is presented in Table 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 Zeeland	3
International	Several countries	4

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

As noted above, the articles were published between 2018-2023. The year and number of articles per year is illustrated in Table 2.

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

The largest number of articles was published in 2022 (17), followed by 2019 (11). The year 2020 (3) had the lowest figure of published articles.

The articles included different levels of school. The number of articles which concerned teachers in general, not a specific level, was 40 and secondary teachers a total of six. Other school levels were K-12 teachers, totalling five articles. One article was on the preschool/kindergarten teacher level.

The articles were also analysed regarding the method used in the articles. The methods in the articles reviewed are illustrated in Table 3.

Table 3. Method in the articles reviewed

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

As presented in the table above, most of the articles employed quantitative method (21). Many of the articles were position articles, literature reviews and policy reviews (15). The articles which employed Qualitative method (9) and Mixed methods (7) were more or less on the same level.

General Themes related to Teacher Shortage

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

Reasons for Teacher Shortage

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

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

In the included articles, teacher shortage was also seen to be related to subjects, such as different subject areas (e.g. See et al., 2022), STEM (e.g. Love & Love, 2023; Han, 2023; Peyton, van Dijk & Mason-Williams, 2023; Reinsfield & Lee, 2022). Other subject areas were seen in Special Education Needs (SEN) (e.g., Peyton, van Dijk & Mason-Williams, 2023) and Bilingual teaching, (e.g. Burke, Ceo-DiFrancesco, 2022; Hernández, Alfaro & Martell, 2022; Peyton, van Dijk & Mason-Williams,

2023; Sada & Ward. (2022**)**. Other forms of teacher shortage reported on were related to geographical areas, such as urban or rural areas, (Pholphirul, Rukumnuaykit & Teimtad, 2023; Seeliger & Håkansson Lindqvist, 2023). Finally, teacher shortage was also seen and discussed in relation to *ethnicity*, (e.g. Goodwin, 2023; Sada & Ward, 2022). Ethnicity is an important aspect for students' identification with teachers. The same can be noted regarding the aspect of *gender***,** (e.g. See et al., 2022) of the teachers in shortage. For student learning meeting teachers of both gender on all levels of school may also be of importance.

Proposed Solutions

In the next sections, themes on the proposed solutions of teacher shortage, that run across the included articles were identified, and will be presented separately: *working conditions and job satisfaction; school policy and school administration; teacher education and side-entrances* and *important stakeholders.*

Working Conditions and Job Satisfaction

As a reason for teacher shortage teachers' working conditions and job satisfaction are frequently mentioned. The negative effects of teacher shortage are linked to teachers' job satisfaction and working conditions, both in the eyes of themselves and in the eyes of others. For strengthening teacher retention and reduce teacher attrition, the included articles proposed a change in the organizational climate and culture of schools.

Several of the articles argue that it is difficult for teachers to cope with heavy workloads and emotional stress (Heffernan et al., 2022). Therefore, there must be clear and strong investments in teacher salary, and higher status for the teaching profession (Wiggan, Smith, & Watson-Vandiver, 2021; Peytonet al., 2021) in order to gain higher job satisfaction for teachers (Toropova, Myrberg & Johansson, 2021). There is time to not only focus on limitations, but also to protect and strengthen the core work of teachers (Pendola et al., 2023). Covid19 has, though, strengthened the respect and awareness of teacher conditions (Bill et al., 2022; Dos Santos, 2021).

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

School Policy and School Administration

To strengthen teacher retention and reduce teacher attrition efforts must be carried out on school policy and school administration levels. Accordingly, as reported in the articles, no teacher, nor school alone can solve the world-wide teacher shortage. Teacher shortage may be affected by government policies such as selection system, education and training leaving age, and school funding system

(See & Gorard, 2020). Administration should, therefore, develop a mutual relationship between school leaders and teachers in order to collaborate more strategically (Burke & Ceo-DiFrancesco, 2022), and support principal leadership and organizational management (Castro, 2023).

School administration and teacher education are another aspect which could support teachers. A well-defined and transparent support system for in-service teachers to retain teachers (Maruca & Zapata, 2022; O'Doherty & Harford, 2018). Policymakers should, in other words, take a distinct long-term approach to establish systematic and large-scale strategies to create a more durable and a more stable profession (Sutcher, Darling-Hammond & Carver-Thomas, 2019; Van den Borre, Spruyt, & Van Droogenbroeck, 2021).

In the literature, the shortage of bilingual teachers and teachers of colour, school administration is a challenge. Here school organizers should prepare school leaders to support teachers of color (Goodwin, 2023). They should also develop critically conscious bilingual educators (Hernández, Alfaro, & Martell, 2022). This is important in teaching pupils of different ethnicities.

When it comes to shortage in rural areas educational leaders should call for additional legislative and policy support for rural teachers (Mitchell, Hampton, & Mambwe, 2022). School organizers are suggested to be context-based; actions and activities should be based on the relative conditions of urban or rural contexts. (McHenry-Sorber & Campbell, 2019), and school administrative strategies should be used to reduce teacher shortage in high-need subjects, such as, SED in rural schools and also to critically evaluate them (Brownell, Bishop & Sindelar, 2018). In rural areas school administrators are suggested to not allow teachers to teach subjects they are not specialized to teach, and not mixed aged levels in same classes (Pholphirul, Rukumnuaykit & Teimtad, 2023). A quick fix for rurality exams is not suggested (Hollo, Floyd & Brigandi, 2019). Instead, policy makers and politicians need to initiate efforts to increase task returns and benefits (Lee, Kang & Park, 2019). Furthermore, school administration should focus on and support policies to both recruit and retain teachers (Darling-Hammond & Podolsky, 2019).

Teacher Education and Side-entrances

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

One suggested solution to increase the recruitment of teachers, is to offer more placement and internship in teacher education programs. Teacher education can put positive emphasis on hands-on education in internship schools and mentors (Pauwels et al., 2022). Prior teaching and learning experiences for teacher students (Madden et al., 2022) has shown to be effective, since early teaching experiences are positive to attract students to teacher programs and higher their perception of teaching as a career – especially culturally and ethnically diverse students (Carothers, Aydin & Houdyshell, 2019). 'Grow Your Own' (GYO) in school district plans for increase participants in teacher programs (Hamman, Matteson &

Nguyen, 2023). Support apprenticeship by GYO, in teaching to recruit and prepare teacher of colour and bilingual educators (Heller, 2021).

The mitigation of the teacher shortage within specific subjects is discussed based on different aspects. Recruitment and retention of bilingual teachers is needed (Sada & Ward, 2022). Further, increased opportunities in teacher programs for bilingual teachers are called for (Jimenez-Silva, Ruiz & Smith, 2022) and should therefore be taken into account. Regarding SEN teachers, teacher education must prepare teacher students for behavioral problems to avoid teacher attrition (Koh, 2022). There are though different perceptions between teachers and school administrator about the needs and roles of SEN teachers (Hagaman & Casey, 2018). Recruitment strategies of SEN teachers and teacher preparation programs are needed (Chamberlin-Kim, Tarnay & Wells, 2019). Teacher education programs should invest more for SEN-teachers in high shortage areas (Peyton et al., 2021), with the purpose to increase recruitment of teachers working with sensory impairments and other SEN in rural and remote schools – and to keep them there (Davis, Pogrund & Griffin-Shirley, 2020).

Another issue for teacher education to elaborate is imbalance between geographical areas within a country. Undergraduate education within areas that have high-needs should be expanded (Peyton, van Dijk, & Mason-Williams, 2023). The importance of mobility of teacher education between states could alleviate teacher shortage in rural areas (Seeliger & Håkansson Lindqvist, 2023). One aspect is that rural areas may be located a long distance from teacher educational programs and therefore cause shortage of teachers in rural areas (Goldhaber et al., 2020).

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

Important Stakeholders

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

Teacher Unions

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

Supportive Parents

Supportive parents are also important stakeholders. When it comes to recruitment at an early stage, pupils are more likely to consider teaching as a future profession when parents, family members, community and others encourage them to become teachers. This is especially true if pupils believe that expectations are reasonable (Christensen et al., 2019). Parents' support and encouragement of their children to become teachers is also depending on the encouragement of people outside the family (Christensen et al., 2022; Davis, Pogrund & Griffin-Shirley, 2020). As parents and teachers in rural areas influence each other, positive interaction between teachers and parents could increase the retention and engagement (Arinaitwe & Corbett, 2022).

Results in Summary

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

Discussion

The aim of this paper was to study teacher shortage through conducting a literature review in order to analyse peer-reviewed articles regarding teacher shortage from the period of 2018-2023. The following questions were posed: 1) How are the causes of the teacher shortage described in current literature? and 2) How do the reasons that have emerged for teacher shortage give an understanding of teacher attrition, teacher recruitment and teacher retention? In answering the first research question, many themes emerged which present challenges which lie behind the current status of teacher shortage.

In regard to teacher attrition, issues regarding low salary, heavy workload, health and well-being and low career opportunities, as reported in this study, are well in line with previous policy (European commission, 2015; Eurydice, 2018) and research Federičová, 2020; Håkansson Lindqvist, Boström & Gidlund, 2022; O'Doherty & Harford, 2018). These aspects are reported in regard to the relatively

low pay of teachers (Dee & Goldhaber 2017; Aldeman, 2015; Ingersoll 2011; Hutchings 2011; Dolton, Tremayne, & Chung 2003). Other aspects such as low status, poor career opportunities and heavy workloads for teachers in schools are also reported (Borman & Dowling 2017; Hayes 2017; Hobson, Giannakaki, & Chambers 2009). International trends point toward an increase in teacher shortage as the number of children entering the educational system increases, teachers retire and leave the profession (UNESCO, 2024). Policies to alleviate teacher attrition will be necessary to promote teacher recruitment and provide a favourable picture of the teaching profession.

In regard to teacher recruitment, entries in teacher education are proposed to be one step towards the downward trend of teacher shortage. Teacher education programmes in many countries have implemented creative recruitment strategies in various areas. Many of these strategies may be both durable and effective. Strategic initiatives will be important to mitigate the challenges related to gender (Aldeman, 2015; Dee & Goldhaber, 2017), ethnic aspects (NCES, 2020) and geographical aspects (Darling-Hammond, 2010; Adamson & Darling-Hammond, 2012). How different countries put policies in place to support recruitment in these groups will demand well thought-through initiatives. New paths in teacher education for male teachers and teachers of ethnic minorities as well as special initiatives to support STEM, SED and bilingual education may also have impact on turning the trend of teacher shortage. Here, policies must also have effective impact in practice.

In regard to teacher retention, in-service teacher will need to support to continue in the teaching profession. New teacher students and new teachers, who enter the teaching profession though new pathways, will need the support of experienced, in-service teachers. This support will be provided by in-service teachers already in the educational system and will require time and effort. Thus, the retention of in-service teachers will be key to support new teachers in their first years of work. The attractiveness of teacher education, and the teacher profession in general will also be important. For new teacher students, both younger teacher students and more experienced academics in other professions who choose a new path in life in teaching, will also be important groups for successful recruitment but also to retain these teachers over time. As also seen in this study, school leaders, school organizers, teacher unions and supportive parents will also be important. These efforts together will most likely provide effective support for teacher retention.

In summary, the results of this study show that teacher shortage is a challenge in many countries throughout the word. Further, the results of this study could be interpreted as a call for action in each specific country context and the acknowledgement of different educational contexts. The reasons for teacher shortage are well reported in the literature. Therefore, it will be important to find new ways to collaborate internationally to disseminate new research on possible solutions to teacher shortage and to identify effective and sustainable efforts and initiatives through policy. If pupils are to receive quality education, in line with the policy goals set by UNESCO (2024), further collaboration regarding how to take on the challenges of teacher attrition, and at the same time promote and support teacher recruitment and retention will be necessary in order to alleviate teacher shortage.

Conclusions

In conclusion, teacher shortage according to the literature is multifaceted, complex and context-based. Moreover, all of the reasons for teacher shortage and the possible solutions appear to interact. Implications for practice involve how different stakeholders can support teachers as professionals. This may involve efforts in policy to increase salaries, prioritising teachers core work with teaching and learning through a shift from administrative work to planning activities for pupils' learning. Efforts to support teachers' status. Supporting new students to enter the teaching profession will also be of importance. Teachers are employed by schools, and schools are submitted to local and national levels to carry out their teaching mission. Flexible and strengthened organizational management on local and national level may support these efforts. With this in mind, the results of this study included proposed changes of school policy and school administration levels on different levels. Initiatives in which governments, school organisers, school leaders, teacher unions, supportive parents and society together take on the challenges of teacher shortage will be necessary. These joint initiatives will most likely alleviate teacher shortage and ease the impact of teacher shortage on the quality of education for pupils in schools.

Limitations and Future Research

In this literature review, the main limitations are found in the search of only one database. One 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.

References

Adamson, F., & Darling-Hammond, L. (2012). Funding disparities and the inequitable distribution of teachers: Evaluating sources and solutions. *Education Policy Analysis Archives, 20*(7), 1–46. https://doi.org/10.14507/epaa.v20n37.2012

Al-Busaidi, & S. Pertanika. (2019). Exploring college of education students' aversion to teaching. *Journal of Social Sciences and Humanities*, 27(1), 149–163.

Aldeman, C. (2015). "Teacher Shortage? Blame the Economy." *Education Next*. October 8. http://educationnext.org/teacher-shortage-blame-the-economy/

Almutawa, H., & Koul, R. (2022) Exploring the Predictors of Job Satisfaction among Arab ESL Teachers. *Eurasian Journal of Educational Research*, 2022(102), 1–20.

Apat, B., Swain, P. (2023). Precarity in the lives of contract teachers: A qualitative study from Odisha, India. *Frontiers in Education*, 8, 10435.

Arinaitwe, G., & Corbett, M. R. (2022). Rural Teacher Shortages and Home-grown Solutions: A Ugandan Case Study. *Australian and International Journal of Rural Education*, 32(1), 18–32.

Bill, K., Bowsher, A., Malen, B., Rice, J.K., & Saltmarsh, J.E. (2022). Making matters worse? COVID-19 and teacher recruitment. *Phi Delta Kappan,* 103(6), 36–40.

Boaz, A. and Sidford A. 2006. Reviewing existing research. In G. Nigel (Ed.). *From postgraduate to social scientist* (pp. 7–24). Sage Research Methods Database.

Borman, G., and N. Dowling. (2017). Teacher Attrition and Retention: A Meta-Analytic and Narrative Review of the Research. *Review of Educational Research* 78 (3): 367–409. doi:10.3102/0034654308321455.

Braun, V. and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology* 3 (2): 77-101.

Brownell, M.T., Bishop, A.M., & Sindelar, P.T. (2018). Republication of "NCLB and the Demand for Highly Qualified Teachers: Challenges and Solutions for Rural Schools". *Rural Special Education Quarterly*, 37(1), 4–11.

Burke, B.M., Ceo-DiFrancesco, D. (2022) Recruitment and retention of world language teacher education majors: Perspectives of teacher candidates and alumni to remedy a global shortage. *Foreign Language Annals*, 55(2), pp. 333–360.

Carothers, D., Aydin, H., & Houdyshell, M. (2019). Teacher shortages and cultural mismatch: District and university collaboration for recruiting. *Journal of Social Studies Education Research*, 10(3), 39–63.

Castro, A. J. (2023). Managing Competing Demands in a Teacher Shortage Context: The Impact of Teacher Shortages on Principal Leadership Practices. *Educational Administration Quarterly*, 59(1), 218–250.

Chamberlin-Kim, J., Tarnay, J., & Wells, J.C. (2019). Alternative Teacher Preparation Programs: Examination Through a Marketing Lens. *Rural Special Education Quarterly*, 38(3), 137–150.

Christensen, S., Davies, R.S., Larsen, R.A.A., ... Hanks, J., Bowles, B. (2022). Parental Perceptions of the Teaching Profession: Factors That Predict Parental Encouragement of Students to Enter the Teaching Profession. *Education Sciences*, 12(11), 734.

Christensen, S.S., Davies, R.S., Harris, S.P., Hanks, J., & Bowles, B. (2019). Teacher recruitment: Factors that predict high school students' willingness to become teachers. *Education Sciences*, 9(4), 282.

Darling-Hammond, L. (2010). *The flat world and Education: How America's commitment to equity will determine our future*. New York, NY: Teachers College Press.

Darling-Hammond, L., Burns, D, Campbell, C., Goodwin, A. L., Hammerness, K., Low, E.L., …Zeichner, K. (2018). *Empowered educators: Teaching quality around the world*. San Francisco, CA: Jossey-Bass.

Darling-Hammond, L., & Podolsky, A. (2019). Breaking the cycle of teacher shortages: What kind of policies can make a difference? | Terminando o ciclo de escassez de professores: Que tipo de políticas podem fazer a diferença? *Education Policy Analysis Archive*s, 27, 34.

Davis, C.S., & Pogrund, R.L., Griffin-Shirley, N. (2020). Project SASI: A community engagement project to increase recruitment and retention of professionals working with students with sensory impairments in rural and remote schools. *Journal of Higher Education Outreach and Engagement*, 24(1), 97–112.

Dee, T., and D. Goldhaber. (2017). *Understanding and Addressing Teacher Shortages in the United States*: The Hamilton Project. Washington, DC: Brookings.

Dolton, P., Tremayne, A., & Chung, T. P. (2003). *The economic cycle and teacher supply*. Paris: OCED.

Dos Santos, L.M. (2021). The relationship between sustainability, stress, and career decision: A study of kindergarten teachers during the covid-19 pandemic. *Sustainability* (Switzerland), 13(20), 11521.

Elsevier. (2023). Scopus. Retrieved from https://www.elsevier.com/blog/scopus

European Commission. (2015). *Joint Report of the Council and the Commission on the Implementation of the Strategic Framework for European Cooperation in Education and Training (ET (2020*). Brussels: European Commission.

European Commission. (2018). Teaching Careers in Europe: Access, Progression and Support. Eurydice Report. Publications Office of the European Union

Eurydice. (2018). *Teaching careers in Europe: Access, progression and support. Eurydice report*. Publications Office of the European Union.

Federicová, M., (2020). Teacher turnover: What can we learn from Europe? European Journal of Education, 2020(00), 1–15. https://doi.org/10.1111/ejed.12429Geiger, T., & Pivovarova, M. (2018). The effects of working conditions on teacher retention. *Teachers and Teaching: Theory and Practice*, 24(6), 604–625.

Fink, A. 2005. *Conducting research literature reviews: From the Internet to paper.* New York, NY: SAGE.

Goldhaber, D., Strunk, K.O., Brown, N., Naito, N, & Wolff, M. (2020) Teacher Staffing Challenges in California: Examining the Uniqueness of Rural School Districts. *AERA Open*, 6(3).

Goodwin, A.L. (2023). Enduring Problems, Rethinking Process, Fulfilling Promises: Reflections on the Continuing Shortage of Teachers of Color. *Journal of Teacher Education*, 74(2), 167–170.

Hagaman, J.L., & Casey, K.J. (2018). Teacher Attrition in Special Education: Perspectives from the Field. *Teacher Education and Special Education*, 41(4), 277–291.

Hamman, D., Matteson, S.M., & Nguyen, T. (2023). Finding Tomorrow's Teachers: Investigating School District Plans for Pre-Collegiate GYO Programs | Encontrando os professores de amanhã: Investigando os planos do distrito escolar para programas pré-universitários GYO . *Education Policy Analysis Archives*, 31, 77.

Han, E. (2023). The Gendered Effects of Teachers' Unions on Teacher Attrition: Evidence from District–Teacher Matched Data in the US. *Feminist Economics*, 29(1), 141–173.

Hayes, P. (2017). "Five Reasons for UK's Worst Ever Teacher Shortage." *Huffpost,* February 26. http://www.huffingtonpost.co.uk/patrick-hayes/teacher-shortage_b_9319692.html

Heffernan, A., Bright, D., Kim, M., Longmuir, F., & Magyar, B. (2022). 'I cannot sustain the workload and the emotional toll': Reasons behind Australian teachers' intentions to leave the profession. *Australian Journal of Education*, 66(2), 196–209.

Heller, R. (2021). The grow-your-own approach to teacher preparation: A conversation with Amaya Garcia. *Phi Delta Kappan*, 103(3), 28–33.

Hernández, S.J., Alfaro, C. & Martell, M.N. (2022). Bilingual teacher educators as language policy agents: A critical language policy perspective of the Castañeda v. Pickard case and the bilingual teacher shortage. *M.A.N. Language Policy*, 21(3), 381–4032022.

Hobson, A., M. Giannakaki, and G. Chambers. (2009). "Who Withdraws from Initial Teacher Preparation Programmes and Why?" *Educational Research,* 51 (3): 321–340. doi:10.1080/00131880903156906.

Hollo, A., Floyd, K.K., & Brigandi, C.B. (2019). Endorsement by Exam: Policy and Practice in Rural Special Education. *Rural Special Education Quarterly*, 38(3), 177–184.

Hutchings, M. (2011). *What Impact Does the Wider Economic Situation Have on Teachers' Career Decisions? A Literature Review*. DfE Research Report DfE-RR136. London, England: DfE.

Håkansson Lindqvist, M., Boström, L. & Gidlund, U., (2022). Teacher shortage in Sweden: time to take action? *Education in the North*, 29(2), 48-67.

Ingersoll, R. (2011). "Do We Produce Enough Maths and Science Teachers?" *Kappanmagazine.org* 92 (6): 37–41.

Ingersoll, R. M., & Perda, D. (2010). Is the supply of mathematics and science teachers sufficient? *American Educational Research Journal, 47*(3), 563–594. https://doi.org/10.3102/0002831210370711

Jimenez-Silva, M., Ruiz, N., & Smith, S. (2022). Lessons learned from exploring the potential of California's mini-corps tutors as future bilingual teachers. *International Journal of Bilingual Education and Bilingualism,* 25(6), 2159–2171.

Koh, M.-S. (2022). An exploration of precursors for at-risk American public schools: The comparative behavioral profiles between children with and without disabilities. *Preventing School Failure*, 66(3), pp. 247–255.

Lee, J.-A., Kang, M.O., & Park, B.J. (2019). Factors influencing choosing teaching as a career: South Korean preservice teachers. *Asia Pacific Education Review*, 20(3), 467–488.

Loeb, S., Darling-Hammond, L., & Luczak, J. (2005). How teaching conditions predict teacher turnover. *Peabody Journal of Education, 80*(3), 44–70.

Love, T.S., & Love, Z.J. (2023). The teacher recruitment crisis: examining influential recruitment factors from a United States technology and engineering teacher preparation program. *International Journal of Technology and Design Education*, 33(1), 105–121.

Macias, A., & Stephens, S. (2019). Intersectionality in the field of education: A critical look at race, gender, treatment, pay, and leadership. *Journal of Latinos and Education*, 18(2), 164–170.

Madden, L., Eriksson, S., Magee, N., Chessler, M., & Vaughan, D.G. (2022). "I Fell in Love with Physics and Wanted to Share that Love with Others:" A Mixed-Methods Analysis of Faculty and Student Perspectives on Choosing to Teach Physics. *Journal of Science Teacher Education,* 33(5), 488–508.

Major, C. H. and Savin-Baden, M. (2010). *An introduction to qualitative research synthesis: Managing the information explosion in social science research.* New York, NY: Routledge.

Maruca, P., & Zapata, Y.P. (2022). Identifying the Needs of Intern Teachers in High Needs Areas of the Profession: District "Must Knows" for Providing Supports and Closing the Hiring Gap. *Journal of School Administration Research and Development,* 7(1), 60–71.

McHenry-Sorber, E., & Campbell, M.P. (2019). Teacher shortage as a local phenomenon: District leader sensemaking, responses, and implications for policy | Falta de professores como um fenômeno local: Sensemaking do líder distrital, respostas e implicações para políticas, *Education Policy Analysis Archives,* 27, 87.

Mitchell, R., Hampton, P., & Mambwe, R. (2022). Teacher Futures: Global Reaction to Teacher Shortages in Rural Locations, IAFOR *Journal of Education*, 10(3), 9–30.

National Center for Education Statistics. (2020, September). *Race and ethnicity of public school teachers and their students*. https://nces.ed.gov/pubs2020/2020103/index.asp

O'Doherty, T., & Harford, J. (2018). Teacher recruitment: reflections from Ireland on the current crisis in teacher supply. *European Journal of Teacher Education,* 41(5), 654–669.

Organisation for Economic Cooperation and Development (OECD). (2014). *TALIS 2013 results: An international perspective on teaching and learning, TALIS*. OECD Publishing.

Pauwels, K., Van Loon, H., Tanghe, E., & Schelfhout, W. (2022). Motives of Student Teachers in Academic Teacher Education for Secondary Education: Research in

Flanders (Belgium) on the Motivation to Become and to Remain a Teacher. *Education Sciences*, 12(10),

Pendola, A., Marshall, D.T., Pressley, T. & Trammell, D.L. (2023). Why teachers leave: It isn't what you think. *Phi Delta Kappan*, 105(1), 51–55.

Peyton, D. J., van Dijk, W., & Mason-Williams, L. (2023). Meeting the Moment: Impact of TEACH Grant on US Undergraduate Education Degree Completion in High-Need Content Areas. *Higher Education Policy*, 36(3), 431–456.

Peyton, D.J., Acosta, K., Harvey, A., ...Fisher, T.L., & Crews, E. (2021). Special Education Teacher Shortage: Differences Between High and Low Shortage States. *Teacher Education and Special Education*, 44(1), 5–23.

Pholphirul, P., Rukumnuaykit, P., & Teimtad, S. (2023). Teacher shortages and educational outcomes in developing countries: Empirical evidence from PISA-Thailand. Cogent Education, 10(2), 2243126.

Preferred Reporting Items for Systematic Reviews and Meta-Analyses. (2020). Retrieved from http://www.prisma-statements.org

Ramot, R., & Donitsa-Schmidt, S. (2021). COVID-19: Education policy, autonomy and alternative teacher education in Israel. *Perspectives in Education*, 39(1), 372–389.

Reinsfield, E., & Lee, K. (2022). Exploring the technology teacher shortage in New Zealand: the implications for quality teaching and learning. *International Journal of Technology and Design Education,* 32(3), 1649–1658.

Sada, E., & Ward, K. (2022). Rethinking the Hispanic Teacher Shortage: Dual Language Schools as Identity-Affirming Organizations. *Journal of Catholic Education*, 25(2), 65–76.

See, B. H., & Gorard, S. (2020). Why don't we have enough teachers? A reconsideration of the available evidence. *Research Papers in Education*, 35(4), 416–442.

Seeliger, S., & Håkansson Lindqvist, M. (2023). Dealing with Teacher Shortage in German. A Closer View of Four Federal States. *Education Sciences,* 13(3), 227.

Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2019). Understanding teacher shortages: An analysis of teacher supply and demand in the United States | Entendendo a escassez de professores: Uma análise da oferta e demanda de professores nos estados Unidos. *Education Policy Analysis Archives*, 27, 35.

Toropova, A., Myrberg, E., & Johansson, S. (2021). Teacher job satisfaction: the importance of school working conditions and teacher characteristics. Educational Review, 73(1), 71–97.

United Nations Educational, Scientific and Cultural Organization (UNESCO). Global report on teachers: addressing teacher shortages and transforming the profession. https://unesdoc.unesco.org/ark:/48223/pf0000388832

U.S. Department of Education Office of Postsecondary Education. (2017). *Teacher shortage areas nationwide listings 1990–1991 through 2017–18*. Washington, DC: U.S. Department of Education.

Van den Borre, L., Spruyt, B., & Van Droogenbroeck, F. (2021). Early career teacher retention intention: Individual, school and country characteristics. *Teaching and Teacher Education*, 105, 103427.

van Rooij, E.C.M., Fokkens-Bruinsma, M., & Goedhart, M.J. (2020). Identifying Potential Secondary School Teachers among Science University Students: A Latent Profile Analysis. *Journal of Science Teacher Education*, 31(5), 556–577.

Wiggan, G., Smith, D., & Watson-Vandiver, M.J. (2021). The National Teacher Shortage, Urban Education and the Cognitive Sociology of Labor. *Urban Review*, 53(1), 43–75.

Wronowski, M.L. (2018). Filling the Void: A Grounded Theory Approach to Addressing Teacher Recruitment and Retention in Urban Schools. *Education and Urban Society,* 50(6), 548–574.