Non-Traditional Teachers and their Role in Educational Inequalities: Navigating the Debate

Name: Tabatha Ros

Student number: 4096258

First supervisor: Thibault Coppe

Second supervisor: Hanke Korpershoek

Word count: 10.689

University of Groningen

Faculty of Behavioral and Social Sciences

Master Educational Sciences

Track: Onderwijsinnovatie

Date: 30-05-2025

Abstract

The growing proportion of non-traditional teachers in the teaching workforce has been the subject of considerable research in existing literature, with an ongoing debate about the teacher quality and effectiveness of non-traditional teachers, and their potential impact on educational inequality. This systematic review examines the different narratives and empirical evidence in existing literature regarding potential benefits and challenges associated with non-traditional teachers. Of the 248 unique studies identified through the databases ERIC, PsycINFO, and Scopus, 14 studies were included in the review after an initial screening of titles and abstracts, followed by a full-text screening. Data from the included studies were extracted through a data extraction form and analysed using both deductive and inductive approaches. The review provides mixed findings, highlighting both challenges and benefits. A recurring challenge concerns insufficient content knowledge, classroom management and pedagogical skills, which may in some cases negatively affect student performance. Conversely, multiple studies show that non-traditional teachers have adequate knowledge and skills, and that they may positively impact student achievement. Several studies also highlight the added value that non-traditional teachers may bring to schools. These mixed results show that there is not one prevailing perspective in this debate. In light of the teacher shortage and the considerable amount of evidence found regarding benefits of SCTs, this thesis argues that it is more constructive to focus on the potential benefits that non-traditional teachers can bring, while simultaneously viewing the identified challenges as opportunities for further improvement.

Keywords: non-traditional teachers, alternative certification, educational equality, teacher effectiveness, teacher preparation, disadvantaged students.

Introduction

Teacher Shortage around the World

Teacher shortage is a common challenge in many countries around the world (Bowen & Williams, 2024). It is a complex phenomenon, with reasons for the shortage varying across different contexts (e.g., problem of attrition or problem of recruitment; Ingersoll & Smith, 2003). According to Marin-Blanco et al. (2023) the working conditions for teachers have changed, as teachers in many contexts experience an increased administrative burden, increased teaching time, work-related stress, and health problems. These factors, in combination with negative media headlines about these problems have contributed to lowering the societal status of the teacher profession (e.g. Bates et al., 2023; Marin-Blanco et al., 2023). These aspects appear to hinder the recruitment of new teachers and to ward off teacher turnover (Marin-Blanco et al., 2023) – which in turn further intensifies the teacher shortage. A report from UNESCO and International Task Force on Teachers for Education 2030 (2024) highlights that 44 million teachers need to be recruited worldwide in 2030 to achieve universal primary and secondary education.

The Diversification of Teachers

One thing that is often seen as part of the solution to the teacher shortage is the employment of non-traditional teachers (NTTs) (Ruitenburg & Tigchelaar, 2021; Tigchelaar et al., 2010). An NTT can be defined as a teacher who has not followed a traditional teacher training program, but has instead completed an alternative certification route or entered the profession without any formal teaching qualification. Since NTTs are often seen as a possible part of the solution to decrease the teacher shortage, many governments around the world have decided to create more opportunities in the teaching profession for NTTs (Baeten & Meeus, 2016; Coppe, 2022), such as flexibilising entry conditions into the teacher profession (Mathou et al., 2022). Indeed, over the

past 15 years, alternative certification has changed from initially being an emergency pathway to cover teacher vacancies (Hoepfl, 2001) to becoming a widely used way to fill regular teacher positions (Bowen et al., 2018; Cohen-Vogel & Smith, 2007; Gimbert et al., 2005; Jacob, 2007). As a result, current teacher certification is now organized either through traditional teacher programs (often university-based) or through alternative certification programs (ACPs). With traditional certification, student-teachers follow a comprehensive training in a school of education where they complete national/regional requirements prior to starting as a teacher. With alternative certification, student-teachers can often start working as a teacher while still completing their certification (Bowen & Williams, 2024).

In some contexts (e.g. Alatalo et al., 2021; Kirksey, 2024; TNTP, 2021) the teacher shortage is so critical that it is possible to work as a teacher without any certification, even if this does not mean working as a 'certified' teacher. For example, in the Netherlands it is not uncommon for schools in secondary education to recruit uncertified teachers. (Ministerie van Onderwijs, Cultuur en Wetenschap [OCW], 2018). One explanation for this, according to the Dutch Ministry of Education, is that schools often struggle with recruiting a sufficient number of certified teachers (OCW, 2018). But this phenomenon is prevalent in other parts of the world as well. The UNESCO Institute for Statistics (2016) reports that of the 73 countries that reported data after 2012, 30 of these countries have less than 80% secondary school teachers who were trained according to their national standards. Evidently, in many countries around the world, recruiting NTTs is viewed as a possible way to decrease the teacher shortage (Baeten & Meeus, 2016; Coppe, 2022; Ruitenburg & Tigchelaar, 2021).

The growing proportion of alternatively certified and uncertified teachers in the teaching workforce has been the subject of considerable research in the literature over the last 35 years.

Many labels have been used to refer to these "new" types of teachers: alternative-certified teachers (e.g., Bowen & Williams, 2024; Cohen-Vogel & Smith, 2007; Lucksnat et al., 2022), career-changers (e.g., Cuddapah & Stanford, 2015), non-traditional teachers (e.g., Flores et al., 2004), lateral-entry teachers (e.g., Brown et al., 2006), non-qualified teachers (e.g. Antera, 2023) or second-career teachers (e.g., Bresges et al., 2023; Chambers, 2002; Coppe, 2025). In this study, the term non-traditional teachers (NTTs) will be used. While many NTTs have previously pursued a career in a different field, this thesis also focuses on alternative teaching programs in which individuals who recently graduated in a field unrelated to teaching start working as a teacher. Therefore, the term NTT appears to be more appropriate for this review.

The Unequal Distribution as a (Potential) Problem

Research shows that traditionally trained teachers (TTTs) who have pursued traditional teacher certification programmes, tend to work in advantaged, affluent schools, while NTTs are more likely to work in disadvantaged schools with many low-income students (Achinstein et al., 2004; Adamson & Darling-Hammond, 2012; Lankford et al., 2002; OECD, 2018; Zumwalt, 1996). This inequitable distribution of NTTs raises a critical question about their impact on educational inequality. Currently, there is an ongoing debate about the difference in teacher quality and effectiveness between TTTs and NTTs (Bowen & Williams, 2024). Certain research concludes that the latter struggle with important teacher skills, such as classroom management and lesson planning (e.g. Gray & Taie, 2015; Koehler et al., 2013; Shwartz & Dori, 2020), which may lead to a lower level of student learning (Baines, 2006; Darling-Hammond, 2000). Moreover, while socioeconomic status is universally linked to disparities in student performance, these disparities appear to be larger in countries where highly qualified and experienced teachers are concentrated in advantaged schools, while teachers with different qualifications and limited or no teaching

experience are predominantly found in disadvantaged schools (OECD, 2018).

If being taught by NTTs does contribute to lower student learning, and NTTs are mostly working at disadvantaged, low-income, high-minority schools, this would not only create but also intensify already existing educational inequalities. It is well known that students from families with a high socioeconomic background generally outscore students from lower economic backgrounds by substantial margins (OECD, 2016). This suggests that students from lower socioeconomic backgrounds require additional attention and support, and that teacher quality is of even greater importance for these students. By distributing NTTs mostly in disadvantaged schools, the already existing inequalities could be amplified.

However, there is also research which finds that students being taught by NTTs achieve the same or more as students being taught by TTTs (Bowen, 2013; Dori et al., 2023; Jacob, 2007; Tournaki et al., 2009). Additionally, some research suggests that NTTs bring a set of skills and competencies with them from experience they may have gained in previous careers, which can be of great value in their teaching (e.g. Darling Hammond et al., 2005; Dori et al., 2023; Hogg et al., 2023). These contrasting findings illustrate the ongoing debate regarding the role of NTTs in education. The current study aims to create a better understanding of whether NTTs play a part in reproducing educational inequalities, or if, on the contrary, they bring additional value to schools apart from resolving teacher shortages. To explore this, a systematic literature review will be conducted, examining both articles providing a narrative as well as articles providing empirical evidence about potential challenges or benefits.

Theoretical Framework

Different Ways of Becoming a Teacher

To attract more NTTs, governments around the world often implement ACPs (Zhang & Zeller, 2016). Additionally, some governments implement policies to flexibilise the entry requirements that individuals need to meet to work as a teacher (Mathou et al., 2020). These implementations aim to make entering the teaching profession more suitable and attractive for individuals who have already pursued a different career and are thinking about becoming a teacher. There has been a substantial increase in ACPs in recent years (Tigchelaar et al., 2010). In Europe for example, ACPs are provided in around one third of all education systems (Birch et al., 2018), showing that ACPs are already implemented in many countries as a solution to the teacher shortage (Ruitenburg & Tigchelaar, 2021).

Through traditional certification, student-teachers receive comprehensive training at an educational institution where they have to meet state-mandated standards in order to receive their teaching certificate. These programs often contain pedagogical knowledge and content knowledge in a certain content area (Bowen & Williams, 2024). In most contexts, these traditional certification programs are a four-year program where students complete a bachelor's degree and gain both pedagogical and content knowledge (e.g. Bowen & Williams, 2024). Sometimes a master’s degree is necessary, depending on the field of education (Hill, 2007; Knapp et al., 1990; Ministerie van Algemene Zaken, 2024).

NTTs who have obtained formal teacher qualifications, most commonly achieve this through an ACP (Tigchelaar et al., 2010). These programs are designed to offer a teaching certificate in a relatively short amount of time, are less costly, and more practically orientated (Blazer, 2012; Zeichner & Schulte, 2001; Zumwalt, 1991, 1996), often targeting individuals who

did not follow a traditional teacher training program. Additionally, student-teachers following an ACP can often already start working as a teacher while still completing their certification (Bowen & Williams, 2024). This makes ACPs generally more attractive to individuals who are transitioning from a previous career. However, there is great variation between the way that ACPs are organized around the world (Birch et al., 2018; Ruitenburg & Tigchelaar, 2021). Some ACPs are not much different from emergency licence procedures, and some are similar to a one-year master program (Zumwalt, 1991, Zumwalt, 1996). ACPs usually consist of multiple professional activities that an individual has to complete before they can start teaching, but the extent of the activities varies between programs. Some programs require individuals to simply attend a small number of extensive workshops, while others also require university coursework (Bowen & Williams, 2024). According to Adcock and Mahlios (2005), most ACPs include comprehensive supervision and mentoring for the student teachers, which is often offered by the organization that provides the certification. They argue however, that the effectiveness of these programs may differ, depending on the way they are constructed and managed. There are also differences in entry requirements between different ACPs. In the United States of America, for example, there are different entry requirements in different states. For some programs, only an associate degree is required – which is a two to three year undergraduate academic degree – while other programs require a bachelor's degree. There can also be different requirements based on the field of study or years of work experience that an individual has (Bowen & Williams, 2024).

In certain contexts, the teacher shortage is so severe that it allows individuals to work as a teacher without certification (e.g. Alatalo et al., 2021; Kirksey, 2024; TNTP, 2021). In many cases, these individuals are enrolled in teacher education programs while being allowed to begin teaching prior to receiving formal certification (e.g. Hurley, 2019, as cited in Calderon 2024; OCW, 2018).

Due to the teacher shortage, schools are sometimes compelled to hire individuals with a degree in a certain field, but without any teacher training (e.g. Sterling & Frazier, 2011). Kirksey (2024) points out that even though ACPs were the primary training route for new teachers in Texas since 2014, in recent years, there has been an increase in the employment of uncertified teachers who are not following any kind of certification program. According to Kirksey, this increase is driven by critical teacher shortages and more flexibility in state policies.

The Distribution of Non-Traditional Teachers

Research shows that TTTs tend to work in advantaged, affluent schools, while NTTs are more likely to work in disadvantaged schools with a large number of low-income students (Achinstein et al., 2004; Lankford et al., 2002; Zumwalt, 1996), in which working conditions are generally worse as well (Coppe, 2025). This unequal distribution can be explained with allocation mechanisms as described by Anagnostopoulos (2003), European Commission: Directorate-General for Education, Youth, Sport and Culture [DG EAC] (2023), Evans (2011) and Ng (2006).

When looking at it from the teacher's perspective, advantaged schools are often seen as more desirable because they have lower poverty rates and high achievement rankings. According to research by Evans (2011), TTTs often associate high poverty with low achievement. This results in most of these teachers avoiding disadvantaged, high-poverty schools (Anagnostopoulos, 2003; Ng, 2006), because the combination of weak cultural and physical capital in the school context prohibits achieving grade standards and makes it harder for teachers to perform their tasks successfully (Evans, 2011). Consequently, disadvantaged schools with high proportions of minority and low-income students are often viewed as less desirable by teachers. Additionally, TTTs usually receive more information about the education system and insider knowledge during their training, which plays a great part in the worksite decisions that they make. With NTTs

receiving less information on this topic, this may negatively influence their ability to make well-informed worksite decisions (Evans, 2011). Since working at advantaged schools is often preferred by teachers, these schools can be more selective when hiring new teachers. Evans (2011) found that overall schools prefer to hire TTTs. In addition to this, the DG EAC (2023) states that schools in disadvantaged areas have more problems recruiting and retaining teachers. If the teacher shortage is felt more in disadvantaged schools, this means they have limited flexibility in selecting the most suitable teachers for their students and are often compelled to accept the candidates who are available. Since most TTTs prefer not to teach at disadvantaged schools, these schools are usually compelled to hire NTTs. These different allocation mechanisms create an inequitable distribution of TTTs and NTTs.

A Vigorous Debate

The unfair distribution of NTTs brings up an important question about their influence on educational inequality. The debate about the effectiveness of NTTs is well-known in the educational community worldwide (Bowen & Williams, 2024). This debate has been going on for more than 35 years (e.g. Hawk & Schmidt, 1989; Watts, 1986) and there is still no consensus on the matter (Coppe, 2025). Research that focuses on the potential difference in effectiveness between TTTs and NTTs often brings forth varied outcomes (Bowen, 2013; Boyd et al., 2009; Koehler et al., 2013). There is research which indicates that students who are taught by TTTs learn and achieve more in school than those who are taught by NTTs (e.g. Laczko-Kerr & Berliner, 2002; Darling-Hammond, 2000; Tuttle et al., 2009; Wenglinsky, 2000). Some research argues that this is due to the fact that NTTs miss certain important aspects of the teaching profession due to following alternative teacher education, or not receiving any formal teacher education at all. For example, certain research suggests that NTTs struggle with classroom management, lesson

planning and attending to different student needs, as a result of not completing a traditional teacher certification program (Gray & Taie 2015; Koehler et al. 2013; Shwartz & Dori 2020). Consequently, this lack of pedagogical and didactic knowledge in NTTs could lead to lower levels of student learning (Baines 2006; Darling-Hammond 2000). There are also studies that find lower levels of self-confidence and self-efficacy in NTTs, when compared to TTTs (Davis et al., 2006, as cited in Blazer, 2012; Laczko-Kerr & Berliner, 2002). These studies showed that TTTs reportedly feel better prepared to "plan instruction, meet the needs of diverse learners, create a positive learning environment, manage their classrooms, motivate students, and conduct assessment" (Blazer, 2012, p. 5).

On the other side of the debate, researchers contradict the claim that TTTs produce better student performances than NTTs. There are different studies that find that students taught by NTTs achieve the same or better results as students taught by TTTs (Bowen 2013; Dori et al. 2023; Jacob 2007; Tournaki et al. 2009). A second argument relevant to the growing importance of NTTs is the added value they can bring to schools. At the classroom level, the experience that NTTs have from potential previous careers and their enthusiasm about a certain subject or field, may be inspiring for students and result in improved achievements (Holdren et al., 2010). These experiences may include applied field knowledge, interpersonal and communication skills, and openness to diversity (Watters & Diezmann, 2015). When it comes to pedagogical knowledge, classroom management skills and content knowledge, multiple studies found no significant differences between TTTs and NTTs (Birkeland & Peske, 2004, as cited in Blazer, 2012; Bowen, 2013; Davis et al., 2006, as cited in Blazer, 2012; Sass, 2011; Wright, 2020). Darling-Hammond (2005) and Dori et al. (2023) even find that NTTs with previous careers often possess more comprehensive content knowledge than TTTs. Knowledge from previous careers also makes it

easier for NTTs to understand the application of the content and provide more real-world applications for students, compared to TTTs (Matsko et al. 2022; Smith 2020). Furthermore, while Davis et al. (2006, as cited in Blazer, 2012) and Laczko-Kerr and Berliner (2002) reported lower levels of self-efficacy in NTTs, Roberts (2016, as cited in Wright, 2020) suggests that there is no significant difference in self-efficacy between TTTs and NTTs.

There are different studies that also highlight the added value that NTTs can bring to schools regarding the organizational level. For example, research by Nielsen (2016) showed that NTTs with previous careers were able to transform knowledge from these careers into their work as a teacher, which did not only benefit them as a teacher but also the schools they worked for. Additionally, NTTs showed to be forward thinking, deeply engaged in their role as a teacher, and showed a layered and multifaceted understanding of professionalism. NTTs' professional identities therefore also displayed new or different perspectives that were not evident in TTTs (Nielsen, 2016). Supervisors in both Nielsen (2016) and Williams (2013) noted that NTTs were often consulted by colleagues as they were able to provide these different perspectives to teaching. Haim and Amdur (2016) also note that NTTs encompass skills such as conflict management, teamwork and self-confidence shaped by past professional experiences. According to Richardson and Watt (2005), these attributes can potentially elevate and diversify the teaching profession and thus be of great value to the school.

Another argument supporting the additional value of NTTs is that the population of NTTs consists of a more diverse group of people compared to TTTs. People from minority groups, men, older people, and people with much experience in other professions, are more likely to become a teacher through ACPs. This might be due to the fact that the alternative programs that NTTs often follow provide more flexibility and require less time investment, which may be more

accommodating to these individuals than traditional programs (Gatlin, 2009; Johnson et al., 2005).

The Present Study

The previous paragraphs show that there is no consensus on the impact of NTTs on educational inequalities. There seem to be two narratives at play, with many different arguments for their beliefs. Due to the teacher shortage, we are witnessing an increase in the proportion of NTTs worldwide (Powers, 2002; Tigchelaar er al., 2010). With the growing proportion of NTTs and their unequal distribution, already existing educational inequalities might be amplified. When students from lower socioeconomic backgrounds, who generally perform less well in school (OECD, 2016), are mostly taught by NTTs, and NTTs really cause a lower level of student learning, then already existing inequalities will be intensified. This possible intensification of educational inequalities makes it important to explore the two narratives at play regarding the strengths and weaknesses of NTTs, and the evidence there is to support these narratives. By conducting a systematic literature review on the narratives and the evidence supporting them, we can better understand whether NTTs participate in reproducing educational inequalities, or if they are an added value for schools, not only as a solution for the teacher shortage, but also through alternative forms of expertise, perspectives, or backgrounds they bring to the profession. This leads to the following research question:

- What are the potential benefits and challenges associated with non-traditional teachers and how is this supported by current research?

To answer this question, the following sub questions have been formed:

- What are the narratives on the benefits associated with non-traditional teachers?
- What are the narratives on the challenges associated with non-traditional teachers?
- What evidence is provided in existing literature about the benefits of non-traditional

teachers?

- What evidence is provided in existing literature about the challenges regarding non-traditional teachers?

Method

Design

A systematic review was conducted to provide an overview and reflect on the narratives and empirical evidence in existing literature, regarding NTTs and their impact on educational equality.

Search Strategy

Multiple databases were searched, as relevant studies are usually published in a range of journals which may not all be accessible through a single database (Newman & Gough, 2020). Specifically, the databases ERIC, PsychINFO and Scopus and were used. To find relevant articles, studies had to be published within the last 25 years, in the form of an academic article, book chapter or PhD dissertation, written in either English or Dutch, focus on NTTs, address educational inequalities, and explicitly discuss benefits or challenges (or an associated phenomenon). To conduct the search in the three databases, a specific search string was constructed, which was built using different terms for the population of interest (NTTs) and terms that, in combination with one of the labels for NTT, would target articles that are about either inequality or disadvantaged students, minority or hard to staff schools, or about the allocation mechanisms of NTTs, as studies focusing on these mechanisms very often problematize them in relation to educational inequalities. The search string uses the Boolean operators ‘OR’ and ‘AND’ to combine terms as well as ‘wildcards’ (the *sign). A preliminary search was conducted in ERIC, PsychINFO and Scopus to

determine whether this search string provided relevant studies. After this preliminary search, some additional terms were added to the search string. The final search string was as follows: (("second career" OR "alternatively certified*" OR "alternative training" OR "alternative certification*" OR "career-change*" OR "non-traditional*" OR "lateral entrant*" OR "unqualified" OR "uncertified" OR " non-qualified" OR "non-certified") AND ("teacher*" OR "educator*" OR "school staff")) AND ("inequal*" OR "equal*" OR "equal opportunit*" OR "allocation" OR "provision" OR "distribution" OR "hard to staff school*" OR "minority" OR "minorities" OR "disadvantaged" OR "at risk student*"))

Selection Strategy

The studies that were found in ERIC, PsychINFO and Scopus were then uploaded to CADIMA, an open access online tool facilitating the conduct and documentation of systematic reviews (Kohl et al., 2018) where duplicates were removed, resulting in 248 unique studies. To systematically and transparently assess the relevance of these studies, the following selection criteria were created:

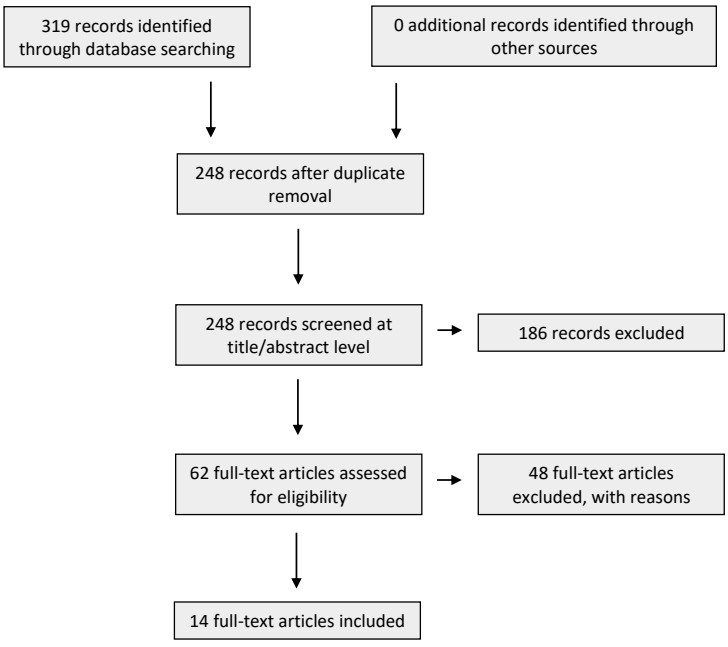
- published within the last 25 years;
- scientific contribution (academic article, scientific book chapter or PhD dissertation);
- written in either English or Dutch;
- focus on NTTs; (or a comparison with NTTs): studies had to explicitly examine NTTs to align with the research objective;
- explicitly discuss barriers/challenges or the added value of NTTs: this criterion ensured that studies provided substantive insights into the barriers or challenges associated with NTTs or the potential added value that NTTs can bring to students and/or schools;
- address educational inequalities, disadvantaged students: to directly contribute to the

central research question, studies needed to discuss NTTs in relation to educational (in)equality.

To confirm whether the studies meet the established selection criteria, the procedure from Newman and Gough (2020) for conducting a systematic literature review has been followed. Firstly, the title and abstracts were checked to decide whether a study met – or was likely to meet – the selection criteria. This resulted in 62 possibly relevant articles. Secondly, the full text of these 62 articles was read and compared to the selection criteria. Fourteen studies were excluded due to the full-text version not being available. After this step, 14 studies were identified as relevant for this systematic review. Figure 1 shows the PRISMA chart of this selection process.

Figure 1

Flow Diagram of Screening Process



Data Extraction

Following the selection process, relevant information from the included studies was extracted and organized. Since this review incorporates both empirical (quantitative or qualitative)

and non-empirical studies, as the focus is on empirical evidence and narratives, a formal critical appraisal was not applied. Critical appraisal methods typically assess broadly three elements: the appropriateness of the study design in relation to the research question, the quality of execution of the study methods and the relevance of the study to the research question (Gough, 2007). However, elements such as the quality of execution of the study methods are less applicable to non-empirical work such as opinion papers, making critical appraisal less suitable for this review. To extract and organize valuable information from the included studies a data extraction form was created in Microsoft Word (see Table 1). This form provides an overview of multiple different aspects of the studies that are relevant for this systematic review. One data extraction form was used per study. For each study, both general information and data relevant to the research questions were extracted. General information included details such as the title, authors, year of publication, location of the study and important characteristics of the study, such as the research method and the context of the study. In addition, data regarding the specific research questions were extracted: whether the study presented a narrative or if it presented empirical evidence, such as differences in student achievement between TTTs and NTTs. The data was extracted using 'quotes': sections of text that were copied into the coding scheme table. Additionally, each quote was categorized into three groups: challenge, benefit or neutral. These categories reflected whether the data presented a challenge, benefit, or a neutral stance in regard to NTTs and their impact on education inequalities. Following this categorization, the information was given a code about their specific theme, which was developed partly inductively, taking into account the different arguments that can be connected to the two sides of the debate. The different codes that were inductively developed in the data extraction process were eventually aggregated in seven final codes. Table 2 provides a definition for each of these codes.

Table 1

Data Extraction Form

Title, authors, year, location			
Context of the research			
Quotes	Narrative vs evidence	Challenge vs benefit vs neutral	Code

Table 2

Definition of Codes

Code	Definition
Student performance	Refers to statements about the impact of NTTs on student performance, such as students' results on test scores
Acquired competences	Captures statements about the pedagogical, classroom, or content knowledge of STCs
Qualities of NTT	Encompasses the personal or professional characteristics attributed to NTTs, such as resilience or ability to connect with students.
Direct impact on disadvantaged students	Refers to findings in a study that have a direct impact on disadvantaged students or on educational (in)equality
Additional support NTTs	Refers to statements about either NTTs themselves wanting (more) additional support or authors of the study arguing that NTTs are in need of more support
Teacher diversity	Addresses the ways in which NTTs contribute to diversity within the teaching workforce, and how this may relate to equity in education
Certification as quality indicator	Encompasses statements about certification as an indicator of teacher quality

Results

Characteristics of the Studies

To provide an overview and reflect on the current literature regarding the narratives and evidence on the impact of NTTs on educational inequalities, 14 studies have been systematically reviewed. All 14 studies were conducted in the United States of America. In this review, both narrative studies (i.e., conceptual or opinion papers) and studies providing empirical evidence were included. Five studies were found to cover both primary and secondary education, either by including teachers working in different grades within primary and secondary education, or by using system-wide administrative data that spans these levels. For example, Donaldson (2012) analyses a sample of Teach For America (TFA) teachers, who are placed across different grades within primary and secondary education. Similarly, Backes et al. (2018) use longitudinal student-level administrative data from TFA teachers in Miami-Dade County Public Schools, linking students to their teachers across six school years and covering multiple grade levels in both primary and secondary education. The studies by Nunnery et al. (2009) and Napoli et al. (2023) look at participants from other alternative certification programs (Troops to Teachers and the School-based Teacher Education program [STEP]) and include teachers from various grade levels within primary and secondary education. Consequently, their samples encompass teachers operating at various grade levels. Three studies included teachers from secondary education (e.g. Wall, 2009), of which one study focused on lower secondary education (Reyes, 2003), and one focused specifically on grade nine teachers (Trevino, 2013) – equivalent to the first year of upper secondary education in the U.S. context. There were two studies that looked at teachers from specific alternative certification programs, who taught in either pre-primary, primary or secondary education (Owings et al., 2015; Schmidt et al., 2018). Furthermore, the study by Hanna and

Gimbert (2011) that did not specify a certain educational level. Finally, there were three studies that looked at special education. Mitchell (2011) looked at teachers from the TFA program who become special education teachers in primary or secondary schools, McKenna et al. (2020) looked at teachers in secondary education and Quigney's (2010) study provided a narrative that was about NTTs in special education, without specifically focusing on a certain education level. An overview of the information about educational levels covered by these studies can be found in the Appendix.

The majority of the studies provided empirical evidence (11 out of 14, e.g. Nunnery et al., 2009; Reyes, 2003), while three studies provided a narrative on this topic (Darling-Hammond, 2001; Hanna & Gimbert, 2011; Quigney, 2010). Five studies mainly discussed challenges regarding NTTs and their effects on educational inequalities (e.g. Schmidt et al., 2018), seven studies discussed their benefits (e.g. Nunnery et al., 2009), and two studies discussed both challenges and benefits (e.g. Reyes, 2003). Table 3 shows for each study whether it provided a narrative or empirical evidence, and whether the main focus of the study was a challenge or a benefit (or both) associated with NTTs.

Table 3

Overview of Studies

Study	Evidence or narrative	Main focus: challenge, benefit or both
Backes et al. (2018)	Evidence	Benefit
Napoli et al., (2023)	Evidence	Benefit
Nunnery et al., (2009)	Evidence	Benefit
Owings et al., (2015)	Evidence	Benefit
Darling-Hammond (2001)	Narrative	Both challenges and benefits
Schmidt et al., (2018)	Evidence	Challenge
Hanna and Gimbert (2011)	Narrative	Benefit

Quigney (2010)	Narrative	Challenge
Donaldson (2012)	Evidence	Benefit
Reyes (2003)	Evidence	Both challenges and benefits
McKenna et al. (2020)	Evidence	Challenge
Trevino (2013)	Evidence	Challenge
Mitchell (2016)	Evidence	Challenge
Wall (2009)	Evidence	Benefit

Table 4 shows for each code the number of studies that discussed the theme of this code, and the number of studies that discussed this theme as either a challenge or a benefit.

Table 4

Overview of Codes and Associated Studies

Code	N studies	Studies	N Challenges	N Benefits	Both
Student performance	8	Backes et al. (2018); Donaldson (2012); McKenna et al. (2019); Nunnery et al. (2009); Owings et al. (2015); Reyes (2003); Trevino (2013); Wall (2009)	2	5	1
Acquired competences	6	Mitchell (2011); Napoli et al. (2023); Owings et al. (2015); Schmidt et al. (2018); Trevino (2013); Quigney (2010)	4	2	0
Qualities of NTTs	2	Hanna and Gimbert (2011); Napoli et al. (2023)	0	2	0
Direct impact on	4	Darling-Hammond, (2001); Mitchell	2	0	2

disadvantaged students / increased educational inequalities		(2011); Reyes (2003); Schmidt et al. (2018)			
Additional support NTTs	4	McKenna et al. (2019); Mitchell (2011); Napoli et al. (2023); Quigney (2010)	4	0	0
Teacher diversity	1	Owings et al. (2015)	0	1	0
Certification as quality indicator	2	Darling-Hammond (2001); Hanna and Gimbert (2011)	0	1	1

Narratives at Play

One goal of this review was to provide an overview of the narratives that are at play regarding the challenges and benefits associated with NTTs and their relation with educational inequality. Three studies that provided a narrative were identified in this review (Darling-Hammond, 2001; Hanna & Gimbert, 2011; Quigney, 2010). The following paragraphs discuss the challenges and benefits that these studies consider.

Challenges

One of the challenges that emerged from the studies providing a narrative is a lack of pedagogical and classroom management skills in NTTs. Quigney (2010) elaborated on the evolution and functioning of ACPs with regard to special education and states that these pedagogical skills, classroom management skills and content knowledge are crucial in order to be a successful teacher. However, when training for these skills is reduced or left out in ACPs, teachers are not sufficiently prepared to do their jobs (Quigney, 2010). Furthermore, she adds that since NTTs can often already start teaching while still in training, this may create problems with

the timing of the training. She states that prospective teachers should receive at least a comprehensive base of training in pedagogical and classroom management skills before entering the classroom. In addition, she suggests that continued and frequent training and support while NTTs are working is essential in ACPs:

> Particularly with the tendency of AC programs toward abbreviated coursework and field experiences as well as early entry into the classroom, it is imperative that these teachers have access to mentoring opportunities and supervisory feedback on a regular basis while performing their classroom functions. (Quigney, 2010, p. 52)

As Quigney finds that most ACPs for special education teachers are working together with institutes of higher education, she strongly suggests that these ACPs provide systematic supervision by the institutes of higher education as part of their program (Quigney, 2010).

A second narrative at play is about the impact of NTTs on student performance. Darling-Hammond (2001) argues that inadequate preparation in ACPs adds to lower learning outcomes in students, particularly for students who need the most support. She further illustrates this point by describing how NTTs are disproportionately placed in schools with the most educationally vulnerable children. According to Darling-Hammond (2001), many of these students are taught by teachers who have received no training in essential skills, such as teaching students how to read. As a result, she argues, these students often begin a trajectory of educational failure: “When they fail to learn, they begin the tortuous process of educational failure that will end for many of them in dropping out or being unable to pass the state tests that would grant them a diploma” (Darling-Hammond, 2001, p. 58-59). Additionally, she warns that when ACPs eliminate certification requirements, this may contribute to the development of a less qualified teaching force (Darling-Hammond, 2001).

Benefits

Hanna and Gimbert (2011) discuss the debate on teacher quality and highlight strengths of

ACPs. Based on their literature review, they conclude that ACPs generally attract individuals with a previous career in a different field, and that these individuals bring evident qualities into teaching. Qualities that they describe include "commitment to children, conviction for building the foundations of society through education, maturity, seasoned professional experiences, content expertise, and rich real-world applications of their disciplines" (Hanna & Gimbert, 2011, p. 40). According to Hanna and Gimbert, these characteristics show that NTTs can be quality teachers. They add that these characteristics are especially important in the context of globalization, as this has created a demand for teachers with creative, collaborative and problem-solving skills, who can additionally connect textbook-knowledge to real-world situations. Furthermore, Hanna and Gimbert argue that the qualities of NTTs are more fitted to the 21st century than TTTs who attained full certification but lack these types of skills. When it comes to certification, they state that a certificate alone cannot be used as a reliable measure for teacher quality, as it is not the only variable that impacts student achievement. Additionally, they conclude that student learning is more than the outcomes of standardized tests and that the quality of a teacher cannot be based solely on a teacher's certification type (Hanna & Gimbert, 2011). This also corresponds with the work of Darling-Hammond (2001), who states that certification is a "relatively crude measure of teachers' knowledge and skills, since the standards for subject matter and teaching knowledge embedded in certification have varied across states and over time, are differently measured, and are differently enforced from place to place." (p. 60).

Empirical Evidence

There were 11 studies identified that provide empirical evidence (e.g. Nunnery et al., 2009; Reyes, 2003). From the 11 studies that provide empirical evidence, four studies discussed challenges (e.g. Schmidt et al., 2018), six studies discussed benefits (e.g. Backes et al., 2018) and

one study discussed both challenges and benefits (Reyes, 2003). The challenges and benefits will be discussed per code, as presented earlier in Table 2.

Challenges

The following sections provide an overview of the empirical studies addressing the challenges associated with NTTs.

Acquired competences. Only one of the studies specifically discussed a challenge regarding content knowledge. Schmidt et al. (2018) used data from a survey of newly certified teachers in Texas to explore differences in content knowledge preparation between traditional and alternative certification programs. They found that content preparation is significantly better in traditional programs than in ACPs, regardless of the type of ACP. They add that even though the mathematics scores of NTTs on college entrance exams are generally higher compared to those of TTTs, this does not appear to compensate for the lack of preservice content preparation. This leads them to suggest that content preparation in certification programs is "at least as important as precollege mathematics ability in influencing teacher content knowledge" (Schmidt et al., 2018, p. 243). However, as the study contains no direct measures of content knowledge of the teachers, it can only be suggestive about the content knowledge of TTTs and NTTs.

With regard to classroom management, Mitchell (2011) looked at the self-efficacy of NTTs in special education before entering the classroom and four months after entering. Mitchell found a significant drop in the self-efficacy of these NTTs regarding classroom management. NTTs indicated that they did not feel they had the tools to manage their classrooms, specifically disordered behaviours that were likely to disrupt the teacher's instructions. Even though NTTs felt these disordered behaviours were traits of the students and not under the students' control, it still shows that these NTTs felt like they missed certain tools to successfully manage their classrooms

(Mitchell, 2011). Mitchell (2011) does not directly compare the self-efficacy of NTTs to that of TTTs. However, she does reference existing literature suggesting that a decline in self-efficacy is a common experience among beginning teachers from all types of certification programs, specifically citing Henson (2001), meaning that this phenomenon might be prevalent in TTTs as well.

Additionally, Mitchell (2011) found a decrease in self-efficacy regarding instructional strategies and student engagement. NTTs stated that they felt they were ineffective teachers, which according to them also had a negative effect on the achievement gains of their students. The NTTs in this study note that this is partly due to their preservice instruction not being sufficient, but they also show shock about the low level of academic functions skills their students encompass (Mitchell, 2011). Both Mitchell (2011) and Trevino (2013) show that NTTs have the necessary content knowledge but lack the pedagogical skills to effectively deliver the content.

Additional support for non-traditional teachers. One of the studies looked at a new teacher residency model in Virginia, U.S. In this study, Napoli et al. (2023) describe that teachers with a provisional license usually do not participate in supervised practice, which, according to Napoli et al., influences their effectiveness as teachers. When they do get support, this is often provided by mentors who also teach full time (Napoli et al., 2023). Additionally, McKenna et al. (2019) found that all NTTs in their study experienced high levels of stress when they were being trained on-the-job. One participant explained: “You are basically thrown into the fire from the start. It is intensive. It is overwhelming.” (McKenna et al., 2019, p. 192). According to McKenna et al., the demands of NTTs who are still in training, while also having the workload of a beginning teacher, are much higher compared to the demands of TTTs. There seems to be a need for additional support when it comes to NTTs. In Mitchell’s (2011) study, all NTTs explained that

their schools provide either no or ineffective support. Participants reported that they would like effective feedback, or a mentor that can support them. This is consistent with the study from McKenna et al. (2019), who suggest that NTTs should receive support from a mentor who has sufficient time to assist, as this will reduce stress and help NTTs to improve as teachers.

Student performance. Two of the empirical evidence studies discussed challenges related to student performance. McKenna et al. (2019) used qualitative methods to look at the experiences of NTTs in special education, while Trevino (2013) looked at the effectiveness of NTTs compared to TTTs on Hispanic students' scores in a specific algebra course. As noted in the paragraph above, McKenna et al (2019) found that NTTs experienced a great deal of stress, which according to these NTTs themselves negatively impacts their students' performance. In addition to this, Trevino (2013) found that students taught by NTTs achieve less than students taught by TTTs. Which, according to Trevino is due to NTTs not being as effective in their instructions even though they have the necessary content knowledge.

Direct impact on disadvantaged students or educational inequalities. Three studies discussed certain challenges regarding NTTs and their direct impact on educational inequalities. NTTs in special education provided negative statements about their own teaching and stated that this also negatively impacted their students' achievement (Mitchell, 2011). This would mean that a group of already disadvantaged students is negatively affected when they are taught by NTTs. Additionally, Reyes (2003) examined teachers with multiple different certification backgrounds at a high poverty school. She found no general statistically significant differences in student achievements between students taught by TTTs or NTTs. However, when it comes to reading, she concluded that non-at-risk students perform better when they are taught by TTTs (Reyes, 2003). This suggests that there is a difference in the effects on reading when being taught by an NTT,

depending on whether a student is considered ‘at-risk’ or not, and that non-at-risk students perform better when taught by TTTs. Furthermore, Schmidt et al. (2018) discussed that the level of content preparation that NTTs receive is lower compared to TTTs. They argue that this might result in greater inequalities because “the weakest teachers are working with the least advantaged students” (p. 71).

Benefits

The following paragraphs will review the benefits that are associated with NTTs in the empirical studies.

Acquired competences. Both Trevino (2013) and Mitchell (2011) briefly discuss the content knowledge of NTTs. Trevino (2013) concluded that NTTs have a sufficient amount of content knowledge. Consistent with this, Mitchell (2011) found that NTTs in special education feel they have enough content knowledge when it comes to teaching their students. When it comes to classroom management and pedagogical skills, Owings et al. (2015) examined how frequently NTTs from the Troops to Teacher program use 17 research-based instructional and classroom management practices, indicating how well their training prepared them to use these practices in their classrooms. In order to examine this, they used quantitative and qualitative data from teachers themselves and their principals. Owings et al. (2015) found that Troops teachers view themselves as effective teachers and indicate that they ‘always’ or ‘usually’ implement the research-based practices. Additionally, their school administrators were very positive about Troops teachers implementing the research-based practices and viewed them as being “well-prepared to meet the needs of diverse learners and verified learning environments” (Owings et al., 2015, p. 85). When comparing Troops teachers to colleague teachers, 74.4% of the school administrators reported that they “Somewhat or Strongly agreed that the Troops teachers are better prepared to teach than other

colleagues in their schools with similar years of teaching experience" (Owings et al., 2015, p. 83).

Furthermore, Napoli et al. (2023) discuss the pedagogical skills of teachers that followed a new teacher residency and induction program in Virginia, U.S. The program is a collaboration between the education faculty of the University of Richmond and a K-12 school. In the residency program teachers get a provisional license while ensuring high quality pre-service clinical practice and increasing the effectiveness of teachers. Napoli et al. (2023) examined the efficacy of residents of the program and graduates who are in their first year of teaching, and found that teachers who completed the residency and joined the program's graduation induction support had "significant increases in efficacy over time, especially in areas related to student engagement and instructional strategies" (Napoli et al., 2023, p. 35).

Qualities of non-traditional teachers. In the study of Napoli et al. (2023), a principal of a school with four students from the new residency and induction program hired all four teachers directly after they completed their residency. The principal states that "their resilience, talent, and ability to connect with the students" surpassed other traditionally prepared fully licensed first-year teachers in her school." (Napoli et al., 2023, p. 35).

Student performance. Five studies discussed benefits regarding student performance associated with NTTs. Nunnery et al (2009) found that the effects of teachers from the Troops to Teachers program on math achievement were significantly higher than the effects of other teachers who taught the same subject, even when the other teachers had on average 3,5 years more experience as a teacher. When Troops teachers were compared to other teachers with the same amount of experience, the mathematical achievements of students being taught by Troops teachers showed even larger positive significant effects. Nunnery et al. (2009) conclude that "Overall, (…) [Troops to Teachers] teachers appear to be more effective in producing students' mathematics

achievement gains regardless of their years of teaching experience" (p. 263). This is consistent with findings from Wall (2009) and Backes et al. (2018). Wall (2009) found that NTTs were overall better at preparing students for their state's math test, as their students' scores were higher than those of the students taught by TTTs. Additionally, Backes et al. (2018) found that schools with large clusters of NTTs from the Teach for America (TFA) program also saw substantial improvements in their students' math achievement.

When it comes to reading, Backes et al. (2018) found that TFA teachers perform better than non-TFA teachers, even if it is only by 0.02 standard deviation on student learning. Backes et al. (2018) add to this that:

> Although the point estimate is a modest 0.02 SD, comparing this against the magnitudes of the estimates from greater experience (in column 4) shows the TFA effect to be roughly equal in magnitude to the effect of having much more senior teachers in the classroom in these data. In other words, though the estimates are modest in size, they imply a meaningful increase in student learning. (p. 463)

Additionally, Nunnery et al. (2009) found that:

> When (…) [Troops to Teachers] teachers were individually matched to other teachers teaching the same subject at the same grade level in the same schools with similar years of teaching experience, a moderately large, statistically significant positive effect on student achievement in reading was associated with (…) [Troops to Teachers] status. (p. 262)

The studies by Backes et al. (2018) and Nunnery et al. (2009) indicate that being taught by an NTT has a positive impact on students' reading performance. Owings et al. (2015) also found that 95.5% of the principals included in the study reported that they 'somewhat' or 'strongly' agreed that a Troops to Teachers teacher has "a positive impact on student achievement" (p. 84). Furthermore, Reyes (2003) concluded that NTTs appeared to be better at preparing at-risk students in math and reading for the Texas Assessment of Academic Skills, which Reyes used for state achievement data, than TTTs. Additionally, a study by Donaldson (2012) finds that teachers from TFA who

were older entrants were more likely to continue teaching, even when controlling for factors such as race, gender, familiarity with urbanicity/rurality of the placement, and other observable characteristics of the teachers. While Donaldson (2012) does not directly evaluate the impact of older TFA teachers on student outcomes, she does highlight that teacher retention is especially important in low-income schools. She points to research showing that in schools with high turnover rates there is often less trust and collaboration among teachers (Guin, 2004), which is associated with lower student performance (Bryk & Schneider, 2003; Goddard et al., 2007; Jackson & Bruegmann, 2009).

Direct impact on disadvantaged students or educational inequalities. One study discussed benefits directly related to the impact of NTTs on disadvantaged students or educational equality. Reyes (2003) findings about NTTs being better at preparing at-risk students, as previously mentioned in the paragraph above, indicate that at-risk students benefit when being taught by an NTT. This finding suggests that educational equality may be improved when at-risk students are taught by NTTs, as more effective teaching for at-risk students can help close achievement gaps.

Teacher diversity. Something that has been suggested as a potential benefit of NTTs is that this is a more diverse group of teachers. Research by Owings et al. (2015) corresponds with this, as they found that the Troops to Teachers program provides: "(...) highly effective minority educators for America's classrooms. Of the (…) [Troops to Teachers] in this study who indicated gender, 56% were male and 12% were female; about 18.8% were African American, 5.8% were Latino, and 40.8% were White" (p. 88). Owings et al. (2015) state that due to the fact that the Troops to Teacher program contributes to more male and minority teachers, more children are seeing teachers who look like themselves leading the classroom, which can "deepen and enrich all

students' educational experiences" (p. 92). Additionally, Owings et al. (2015) suggest that minority educators might be better at understanding the different cultural backgrounds of their students and can thus better regulate the attitudes of these students that hinder their learning experience. However, this idea is not supported by specific data in their study.

Discussion

This systematic review aimed to develop a better understanding of the different narratives and the empirical evidence regarding the potential benefits and challenges associated with NTTs. The employment of NTTs is often seen as part of the solution to the teacher shortage that is prevalent in many contexts worldwide (Ruitenburg & Tigchelaar, 2021; Tigchelaar et al., 2010). Many countries now implement ACPs aimed at training NTTs, and in some cases entry requirements for teachers have become more flexible (Baeten & Meeus, 2016; Bowen et al., 2018; Cohen-Vogel & Smith, 2007; Coppe, 2022; Gimbert et al., 2005; Jacob, 2007; Mathou et al., 2022). However, research clearly shows that there is an unequal distribution of NTTs, as they are more likely to work in schools with disadvantaged students than TTTs (Achinstein et al., 2004; Adamson & Darling-Hammond, 2012; Lankford et al., 2002; OECD, 2018; Zumwalt, 1996). If what critics of NTTs argue is true and the teacher quality of NTTs is worse compared to TTTs (e.g. Gray & Taie, 2015, Baines, 2006), the unequal distribution would amplify already existing educational inequalities, since these 'less effective' teachers are teaching the already disadvantaged students.

To discover whether being taught by NTTs has a positive or negative impact on students and educational equality, it is important to understand what the effects of being taught by an NTT really are. Do they have a negative impact on student learning, and thus, due to the unequal

distribution of NTTs, amplify educational inequalities? Or do they positively impact student learning and perhaps even bring valuable experience from previous careers? Both these narratives have been explored in this review, including empirical evidence supporting these narratives.

The findings revealed a mixed picture, with studies highlighting both challenges and benefits regarding NTTs. Only three studies provided a narrative on benefits or challenges associated with NTTs. A challenge that was often discussed in the studies providing a narrative is that NTTs lack pedagogical and classroom management skills. According to these studies, this is due to ACPs providing less training in these aspects compared to traditional programs while simultaneously placing NTTs in classrooms before receiving a basic level of training. One of these studies also suggests that this lack of preparation may negatively impact student performance, particularly among students most in need of support, who are more often taught by NTTs. A narrative that is provided regarding benefits of NTTs is that NTTs bring valuable qualities – such as life experience and adaptability – which TTTs often lack and are seen as beneficial for 21st-century education.

Regarding the 11 studies providing empirical evidence, several challenges related to NTTs were identified. Multiple studies provide evidence suggesting that NTTs lack the necessary pedagogical skills and may negatively impact student learning, which is consistent with previous research (e.g. Darling-Hammond, 2000; Laczko-Kerr & Berliner, 2002; Tuttle et al., 2009; Wenglinsky, 2000). The lack of pedagogical skills may stem from the fact that ACPs offer less training in this area compared to traditional programs, and from NTTs already starting as a teacher while still being in training. However, several studies also provided empirical evidence regarding benefits related to NTTs. Consistent with findings from Bowen (2013), Dori et al. (2023), Jacob (2007), and Tournaki et al. (2009), this review identified multiple studies indicating that students

taught by NTTs achieve similar or better results compared to students taught by TTTs. Similar to findings from Darling-Hammond et al. (2005), Dori et al. (2023) and Hogg et al. (2023), multiple studies in this review emphasized the valuable skills and knowledge that NTTs bring from previous careers. Furthermore, numerous studies report that NTTs possess a sufficient amount of content knowledge, and both NTTs and school administrators express positive views regarding their pedagogical competencies and classroom knowledge.

One possible explanation for the mixed findings lies in the considerable variation across the ACPs that NTTs participate in. As noted in the theoretical framework of this review, there are differences in how these programs are structured and what they offer, which might create differences in effectiveness of these programmes (Adcock & Mahlios, 2005). This variability may lead to inconsistent outcomes in research about NTTs, making it more difficult to paint a coherent picture of the overall effects of NTTs on educational inequality in all contexts.

While the findings are somewhat mixed, this review finds a satisfactory amount of evidence supporting the narrative that NTTs can, in many cases, have a positive impact on student learning and educational equality. Even though there is also evidence supporting the narrative that NTTs have a negative impact on student learning and educational equality, I would argue that this evidence is not sufficiently compelling to support this narrative as the prevailing perspective. Considering the fact that the teacher shortage is a problem in many countries around the world (Bowen & Williams, 2024), and these countries are usually not able to train a sufficient number of teachers via traditional teacher training programs (OCW, 2018; UNESCO Institute for Statistics, 2016), disregarding the potential of NTTs would be questionable, especially when there is a considerable amount of evidence presenting benefits regarding NTTs. Even though this review also finds evidence suggesting NTTs lack important skills and may negatively impact student

learning, I believe we should not view these findings as reasons to refrain from hiring NTTs. Instead, these findings should be viewed as areas for improvement when training NTTs. By recognizing these possible challenges, ACPs should aim to provide adequate training in these areas and perhaps improve additional support, such as mentoring programs. This way, the potential of NTTs regarding the teacher shortage, student learning and educational equality can be leveraged, while acknowledging potential challenges and identifying appropriate solutions.

Beyond improving training and support, it is also important to reflect on the broader implications of alternative certification and the employment of NTTs for the status of the teaching profession. Although this thesis has focused mainly on the impact of NTTs on students, it is also important to reflect on how the growing number of NTTs and ACPs may affect the professional status of teaching. While teacher quality is often viewed as a key determinant of the quality of educational systems (Brewer, 2003; OECD, 2005; Paine & Zeichner, 2012;), the teacher shortage has prompted governments to attract NTTs (Baeten & Meeus, 2016; Coppe, 2022), despite ongoing concerns about their teaching quality (e.g. Baines, 2006; Darling-Hammond, 2000). Although the employment of NTTs may help with urgent shortages, it may also unintentionally contribute to a perception that traditional teacher certifications – or certification altogether – is optional. This perception can undermine the professional status of teaching and may also contribute to negative attitudes among TTTs toward their NTT colleagues. To maintain or improve the professional status of teachers, it is essential to ensure that ACPs provide a sufficient level of training, and to emphasize the benefits that NTTs can bring to the teaching profession.

Taken together, the findings of this review suggest that while continuing the debate about the effectiveness of NTTs and their impact on educational equality can help identify areas for improvement, a polarized ‘pros versus cons’ discussion may no longer be productive. Considering

current educational challenges such as the teacher shortage, it seems more constructive to focus on the valuable benefits NTTs have to offer, while leveraging the identified challenges as opportunities for further improvement.

Limitations

The inclusion of studies with diverse research designs and educational contexts may have contributed to the mixed findings of this review. As a result, it is more difficult to draw general conclusions across studies. However, this plurality of perspectives could also add value, as it highlights the complexity of the topic and encourages a more nuanced understanding of NTTs and their impact. As Gough (2007) points out:

> A plurality of perspectives and approaches can be a strength if it is a result of many differing views contributing to a creative discussion of what we know and how we know it and what we could know and how we could know it. (p. 4)

A second limitation concerns the varying quality of the empirical evidence included in this review. For instance, evidence from studies based on a relatively small sample of teachers or students should be interpreted with more caution, and the extent to which these results can be generalized to the entire population is limited. This review included studies with both relatively weaker and stronger evidence, as long as they complied with the criteria that were drawn up. However, it is important to acknowledge that not all evidence weighs the same.

Another limitation of this review is that only three databases were used when searching for articles, meaning that possible relevant studies outside of these databases were not included. Additionally, only studies in English were included (there were no relevant Dutch articles found), as a result, relevant information from studies published in other languages might have been overlooked in this review. Lastly, all included studies were conducted in the United States of America, resulting in a relatively homogeneous contextual background.

Implications for future research and practice

To provide a more comprehensive overview of the global situation regarding NTTs and their impact on educational equality, future research should aim to include studies conducted in a broader range of international contexts, and consider incorporating studies published in languages other than English. As educational systems and ACPs vary across the world, incorporating a broader range of international perspectives could lead to a more comprehensive understanding of the potential of NTTs across different settings. This would also reduce potential publication and language biases that currently limit the generalizability of this review. Additionally, since ACPs differ in their organization – which may affect their effectiveness – future research could further examine whether different types or aspects of ACPs are more or less effective at training NTTs. This provides insights in which components are crucial for a successful ACP and might offer more insights into possible causes for the mixed findings of this review. Furthermore, while this review aimed to distinguish both narratives and empirical evidence, future research could employ statistical techniques – such as meta-analytic methods – to build on the findings of this review. This way the statistical findings across studies can be statistically compared, which may create a more precise synthesis of the statistical effects of NTTs that are found regarding student learning. This may also provide more insights into which specific factors contribute to certain outcomes.

Since a lack in skills, such as content knowledge, classroom management or pedagogical skills, are often discussed in studies providing either a narrative or empirical evidence, this suggests that, in some cases, these skills might be in need of improvement. For this reason, it is important that ACPs provide sufficient training in these areas, providing NTTs with the skills to effectively deliver their knowledge to students. Additionally, since some evidence showed that NTTs may experience high levels of stress, especially when they are being trained on the job,

providing adequate support for NTTs seems beneficial. This may help them navigate the challenges that they encounter while starting as a teacher and can, for example, be done via mentoring programs. Although such programmes have already been implemented in some contexts, ensuring that mentors have sufficient time to provide effective support to NTTs remains essential. If we choose to recognise the value of NTTs and continue to invest in them to help reduce teacher shortages and increase educational equality, it is essential to also invest in their integration within schools. Research shows that NTTs experience higher attrition rates than TTTs (Carver-Thomas & Darling-Hammond, 2017; Redding & Smith, 2016), although these rates may vary across countries (Coppe, 2022). Since effective teacher induction plays a crucial role in retention (Ingersoll, 2012; Kelley, 2004; Ronfeldt & McQueen, 2017), school leaders should prioritise the induction process for NTTs. In a study by Thomas (2017) most NTTs expressed a fear of being judged by their colleagues based on their alternative certification. As peer support is an important part of successful induction (Baker-Doyle & Yoon, 2020; Colognesi et al., 2020; Moolenaar, 2012; Thomas et al., 2019), it is essential for school management to invest in the induction process of NTTs and stimulate good relationships between NTTs and TTTs within a school.

In conclusion, while this systematic review identified both potential benefits and challenges associated with NTTs, the evidence remains mixed and somewhat fragmented. However, this review does not provide sufficient evidence to fully support the narrative that NTTs consistently have a negative impact on student learning and educational equality. Moreover, there is also considerable evidence supporting the narrative that NTTs bring valuable skills from previous careers and can have a positive impact on student learning. This shows that NTTs have great potential to improve educational equality, and disregarding this potential would be unwise,

not only in light of the global teacher shortage, but also considering the potential benefits for (disadvantaged) students.

Literature

Achinstein, B., Ogawa, R. T., & Speiglman, A. (2004). Are we creating separate and unequal tracks of teachers? The effects of state policy, local conditions, and teacher characteristics on new teacher socialization. *American educational research journal, 41*(3), 557-603.

Adamson, F., & Darling-Hammond, L. (2012). Funding disparities and the inequitable distribution of teachers: Evaluating Sources and solutions. *Education Policy Analysis Archives, 20*, 37. https://doi.org/10.14507/epaa.v20n37.2012

Adcock, P. K., & Mahlios, M. (2005). Nontraditional alternative teacher certification programs: their purpose, design and participants. *Essays in Education, 15*(1), 4. https://openriver.winona.edu/cgi/viewcontent.cgi?article=1121&context=eie

Alatalo, T., Hansson, Å., & Johansson, S. (2021). Teachers' academic achievement: evidence from Swedish longitudinal register data. *European Journal Of Teacher Education, 47*(1), 60–80. https://doi.org/10.1080/02619768.2021.1962281

Anagnostopoulos, D. (2003). The new accountability, student failure, and teachers' work in urban high schools. *Educational Policy, 17*(3), 291–316. https://doi.org/10.1177/0895904803017003001

Antera, S. (2023). Competence importance and acquisition: comparing qualified and non-qualified vocational teachers. *Journal of Education and Work, 36*(2), 109–124. https://doi.org/10.1080/13639080.2023.2167956

Backes, B., Hansen, M., Xu, Z., & Brady, V. (2018). Examining spillover effects from Teach for America Corps members in Miami-Dade County public schools. *Journal of Teacher Education, 70*(5), 453–471. https://doi.org/10.1177/0022487117752309

Baeten, M., & Meeus, W. (2016). Training second-career teachers: A different student profile, a different training approach? *Educational Process: International Journal, 5*(3), 173-201.

Baines, L. (2006). Deconstructing teacher certification. *Phi Delta Kappan, 88*(4), 326–328. https://doi. org/10.1177/003172170608800417

Baker-Doyle, K. J., & Yoon, S. A. (2020). The social side of teacher education: Implications of social network research for the design of professional development. *International Journal of Educational Research, 101*, 101563. https://doi.org/10.1016/j.ijer.2020.101563

Bates, G., Fisher, R., Turner, K., Machirori, T. L., & Rixon, A. (2023). Raising the social status of teachers: teachers as social entrepreneurs. *The Australian Educational Researcher*, *51*(4), 1405–1424. https://doi.org/10.1007/s13384-023-00646-4

Birch, P., Balcon, M., Bourgeois, A., Davydovskaia, O., Tremosa, S. P., European Commission, & Eurydice. (2018). *Teaching Careers in Europe: Access, Progression and Support. Eurydice Report*. Publications Office of the European Union. https://eric.ed.gov/?id=ED58898

Blazer, C. (2012). What the research says about alternative teacher certification programs. Information capsule. Volume 1104. *Research Services, Miami-Dade County Public Schools*. http://files.eric.ed.gov/fulltext/ED536506.pdf

Bowen, B. D. (2013). Measuring teacher effectiveness when comparing alternatively and traditionally licensed high school technology education teachers in North Carolina. *Journal of Technology Education, 25*(1), 80–98. https:// doi.org/10.21061/jte.v25i1.a.6

Bowen, B. D., Coats, T., Williams, T. O., & Ernst, J. V. (2018). Secondary engineering design graphics educators: Credentials, characteristics, and caseload. *Engineering Design Graphics Journal, 82*(1), 1–12.

Bowen, B., & Williams, T. (2024). How do alternatively and traditionally certified beginning workforce development teachers feel about their preparedness? *The Journal Of Technology Studies, 49*(1), 21–31. https://doi.org/10.21061/jts.417

Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. (2009). Teacher preparation and student achievement. *Educational Evaluation and Policy Analysis, 31*(4), 416–440. https://doi.org/10.3102/0162373709353129

Bresges, A., Dawkins, D. J., Del Gobbo, G., & Kramp, D. (2023). Second-career teachers and lateral entry programmes: The state of the art in England, Germany, and Italy. In D. Frison, D. Dawkins, & A. Bresges (Eds.), *Teaching as a second career: Non-traditional pathways and professional development strategies for teachers*. Pensa Multimedia.

Brewer. T., (2003) The "grand paradox" in teacher preparation and certification policy. *Arts Education Policy Review, 104*(6), 3-10. DOI: 10.1080/10632910309600974

Brown, M. B., Bolen, L. M., Lassiter, C. L., & Burke, M. M. (2006). Competencies of traditionally prepared and lateral entry teachers: Implications for school Administrators. *AASA Journal of Scholarship & Practice, 3*(1), 18–25. https://eric.ed.gov/?id=EJ843070

Bryk, A. S., & Schneider, B. (2003). Trust in schools: a core resource for school reform. *Educational Leadership*, *60*(6), 40–44.

Calderon, M. M. (2024). Teaching without a license: uncertified universal preK teachers' policy perspectives. *School Community Journal*, *34*(1), 269–290.

Carver-Thomas, D., & Darling-Hammond, L. (2017). *Teacher turnover: why it matters and what we can do about it*. Learning Policy Institute. https://learningpolicyinstitute.org/product/teacher-turnover

Chambers, D. (2002). The Real World and the Classroom: Second-Career Teachers. The Clearing House A Journal Of Educational Strategies Issues And Ideas, 75(4), 212–217. https://doi.org/10.1080/00098650209604935

Cohen-Vogel, L., & Smith, T. (2007). Qualifications and assignments of alternatively certified teachers: Testing core assumptions. *American Educational Research Journal, 44*(3). https://doi. org/10.3102/0002831207306752

Colognesi, S., Van Nieuwenhoven, C. et Beausaert, S. (2020). Supporting newly-qualified teachers' professional development and perseverance in secondary education: On the role of informal learning. *European Journal of Teacher Education, 43*(2), 258-276. https://doi.org/10.1080/02619768.2019.1681963

Coppe, T. (2022). *Untangling second career teachers' entry process in TVET schools: From the suitability of entry profiles to the benefits of social capital for a successful work socialization process*. Doctoral dissertation. UCLouvain.

Coppe, T. (2025). The expanded presence of second-career teachers: Redefining the teaching profession and career. In X. Dumay, T. B. Sorensen, & L. Paine (Eds.), *World yearbook of education 2025: The teaching profession in a globalizing world: Governance, career, learning* (pp. 129-142). Routledge. https://doi.org/10.4324/9781003441731-9

Cuddapah, J. L., & Stanford, B. H. (2015). Career-changers' ideal teacher images and grounded classroom perspectives. *Teaching and Teacher Education, 51*, 27-37.

Darling-Hammond, L. (2000). *Solving the dilemmas of teacher supply, demand, and standards: how we can ensure a competent, caring, and qualified teacher for every child.* National Commission on Teaching and America's Future. Retrieved January 3, 2025, from https://eric.ed.gov/?id=ED463337

Darling-Hammond, L. (2001). The research and rhetoric on teacher certification: A response to "Teacher certification reconsidered." *National Commission on Teaching and America's Future*. http://files.eric.ed.gov/fulltext/ED477296.pdf

Darling-Hammond, L., Holtzman, D. J., Gatlin, S. J., & Heilig, J. V. (2005). Does teacher preparation matter? Evidence about teacher certification, Teach for America, and teacher effectiveness. *Education Policy Analysis Archives, 13*(42), 1–51. https://doi.org/10.14507/epaa. v13n42.2005

Donaldson, M. L. (2012). The promise of older novices: Teach for America Teachers' age of entry and subsequent retention in teaching and schools. *Teachers College Record the Voice of Scholarship in Education, 114*(10), 1–37. https://doi.org/10.1177/016146811211401008

Dori, Y. J., Goldman, D., Shwartz, G., Lavie-Alon, N., Sarid, A., & Tal, T. (2023). Assessing and comparing alternative certification programs: The teacher-classroom-community model. *Frontiers in Education, 8*. https://doi.org/10.3389/feduc.2023.1006009

European Commission: Directorate-General for Education, Youth, Sport and Culture. (2023). *Education and training monitor 2023: Comparative report*. Publications Office of the European Union. https://data.europa.eu/doi/10.2766/936303.

Evans, L. (2011). The motivations to enter teaching by age related career stage and certification path. *Sociological Spectrum, 31*(5), 606–633. https://doi.org/10.1080/02732173.2011.589786

Flores, B. B., Desjean-Perrotta, B., & Steinmetz, L. E. (2004). Teacher efficacy: A comparative study of university certified and alternatively certified teachers. *Action in Teacher Education, 26*(2), 37-46.

Gatlin, D. (2009). A pluralistic approach to the revitalization of teacher education. *Journal of Teacher Education, 60*(5), 469–477. https://doi.org/10.1177/0022487109348597

Gimbert, B., Cristol, D., Wallace, D., & Sene, A. M. (2005). A case study of a competency-driven alternative route to teacher licensure in an urban "hard to staff" school system. *Action in Teacher Education, 27*(1), 53-71.

Goddard, Y. L., Goddard, R. D., & Tschannen-Moran, M. (2007). A theoretical and empirical investigation of teacher collaboration for school improvement and student achievement in public elementary schools. *Teachers College Record the Voice of Scholarship in Education, 109*(4), 877–896. https://doi.org/10.1177/016146810710900401

Gough, D. (2007). Weight of evidence: A framework for the appraisal of the quality and relevance of evidence. *Research Papers in Education, 22*(2), 213–228.

Gray, L., & Taie, S. (2015). *Public school teacher attrition and mobility in the first five years: Results from the first through fifth waves of the 2007–08 beginning teacher longitudinal study* (NCES 2015–337). United States Department of Education National Center for Education Statistics. http://nces.ed.gov/pubsearch

Guin, K. (2004). Chronic teacher turnover in urban elementary schools. *Education Policy Analysis Archives*, 12, 42. https://doi.org/10.14507/epaa.v12n42.2004

Haim, O., & Amdur, L. (2016). Teacher perspectives on their alternative fast-track induction. *Teaching Education, 27*(4), 343–370. https://doi.org/10.1080/10476210.2016.1145204)

Hanna, P. L., & Gimbert, B. (2011). Falling flat: Certification as an insufficient indicator of teacher quality. *JNAAC, 6*(2), 31–52. http://files.eric.ed.gov/fulltext/EJ1053342.pdf

Hawk, P. P., & Schmidt, M. W. (1989). Teacher preparation: A comparison of traditional and alternative programs. *Journal of Teacher Education, 40*(5). https://eric.ed.gov/?id=EJ399746

Henson, R. K. (2001). The effects of participation in teacher research on teacher efficacy. *Teaching and Teacher Education, 17*(7), 819–836. https://doi.org/10.1016/s0742-051x(01)00033-6

Hill, H. C. (2007). Learning in the teaching workforce. *Future of Children, 17*(1), 111–127.)

Hoepfl, M. (2001). Alternative Routes to Certification of Technology Education Teachers. *Journal of Technology Studies, 27*(2), 74-83.

Hogg, L., Elvira, Q., & Yates, A. (2023). What can teacher educators learn from career-change teachers' perceptions and experiences: A systematic literature review. *Teaching and Teacher Education, 132,* 104208.

Holdren, J. P., Lander, E. & Varmus, H. (Chairs). (2010). Prepare and inspire: K-12 science, technology, engineering, and math (STEM) education for America's Future. Washington, DC: President's Council of Advisors on Science and Technology. Retrieved from http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-stemed-report.pdf

Ingersoll, R. M. (2003). Is there really a teacher shortage? The Consortium for Policy Research in Education and The Center for the Study of Teaching and Policy; University of Pennsylvania. http://repository.upenn.edu/gse_pubs/133

Ingersoll, R. M. (2012). Beginning teacher Induction: What the data tell us. *Phi Delta Kappan, 93*(8), 47–51. https://doi.org/10.1177/003172171209300811

Jacob, B. A. (2007). The challenges of staffing urban schools with effective teachers. *The Future of Children, 17*(1), 129–153. http://www.jstor.org/stable/4150023

Jackson, C. K., & Bruegmann, E. (2009). Teaching students and teaching each other: The importance of peer learning for teachers. *American Economic Journal Applied Economics, 1*(4), 85–108. https://doi.org/10.1257/app.1.4.85

Johnson, S. M., Birkeland, S. E., & Peske, H. G. (2005). *A difficult balance project on the next generation of teachers: Incentives and quality control in alternative certification.* Project on the Next Generation of Teachers, Harvard Graduate School of Education. Retrieved January 17, 2025, from https://www.nctq.org/nctq/research/1135274951204.pdf

Kelley, L. M. (2004). Why induction matters. *Journal of Teacher Education, 55*(5), 438–448. https://doi.org/10.1177/0022487104269653

Kirksey, J. J. (2024). Amid rising number of uncertified teachers, previous classroom experience proves vital in Texas. Policy Brief. No. 1. *Center for Innovative Research in Change, Leadership, and Education, Texas Tech University*.

Knapp, J. L., McNergney, R. F., Herbert, J. M., & York, H. L. (1990). Should a master's degree be required of all teachers? *Journal Of Teacher Education, 41*(2), 27–37. https://doi.org/10.1177/002248719004100204

Koehler, A. A., Feldhaus, C. R., Fernandez, E., & Hundley, S. (2013). Alternative certification programs & pre-service teacher preparedness. Journal of STEM Education, 14(4), 45–55. https://eric.ed.gov/?id=EJ1017059

Kohl, C., McIntosh, E. J., Unger, S., Haddaway, N. R., Kecke, S., Schiemann, J., & Wilhelm, R. (2018). Online tools supporting the conduct and reporting of systematic reviews and systematic maps: a case study on CADIMA and review of existing tools. *Environmental Evidence, 7*(1). https://doi.org/10.1186/s13750-018-0115-5

Laczko-Kerr, I., & Berliner, D. C. (2002). The effectiveness of "Teach For America" and other under-certified teachers on student academic achievement: A case of harmful public policy. *Education Policy Analysis Archives, 10*(37). https://asu.pure.elsevier.com/en/publications/the-effectiveness-of-teach-for-america-and-other-under-certified-

Lankford, H., Loeb, S., & Wyckoff, J. (2002). Teacher sorting and the plight of urban schools: A descriptive analysis. *Educational evaluation and policy analysis, 24*(1), 37-62

Lucksnat, C., Richter, E., Schipolowski, S., Hoffmann, L., & Richter, D. (2022). How do traditionally and alternatively certified teachers differ? A comparison of their motives for teaching, their well-being, and their intention to stay in the profession. *Teaching and Teacher Education, 117,* 103784.

Marin-Blanco, A., Bostedt, G., Michel-Schertges, D., & Wüllner, S. (2023). Studying teacher shortages: Theoretical perspectives and methodological approaches. *Journal of Pedagogical Research, 7*(1), 128-141. https://doi.org/10.33902/JPR.202319067

Mathou, C., Sarazin, M. A. C., & Dumay, X. (2020). Whither employment protections? Deregulation and the flexibilisation of the teaching workforce in the state-funded sector. *Journal of Education Policy, 00*(00), 1–23. https://doi.org/10.1080/02680939.2020.1819568

Matsko, K. K., Ronfeldt, M., & Nolan, H. G. (2022). How different are they? Comparing teacher preparation offered by traditional, alternative, and residency pathways. *Journal of Teacher Education, 73*(3), 225–239. https://doi.org/10.1177/00224871211015976

McKenna, J. W., Brigham, F. J., Parenti, M., & Hott, B. (2019). Foundational assumptions for successful transition: Examining alternatively certified special educator perceptions. In

Advances in special education (pp. 185–204). https://doi.org/10.1108/s0270-401320190000035019

Ministerie van Algemene Zaken. (2024, november 26). *Hoe word ik leraar in het voortgezet onderwijs?* Rijksoverheid.nl. https://www.rijksoverheid.nl/onderwerpen/werken-in-het-onderwijs/vraag-en-antwoord/leraar-voortgezet-onderwijs

Ministerie van Onderwijs, Cultuur en Wetenschap. (2018, August 15). *Risicoscholen onbevoegd lesgeven*. Themarapport | Inspectie Van Het Onderwijs. https://www.onderwijsinspectie.nl/onderwijssectoren/voortgezet-onderwijs/documenten/rapporten/2017/11/29/risicoscholen-onbevoegd-lesgeven

Mitchell, M. (2011). *Closing the gap: The effects of alternative certification programs on intern self-efficacy* [PhD Dissertation]. Loyola Marymount University.

Moolenaar, N. (2012). A social network perspective on teacher collaboration in schools: Theory, methodology, and applications. *American Journal of Education, 119*(1), 7–39

Napoli, D., Kuti, L., & Spires, B. (2023). Leveraging existing policy for a university/K-12 partnership: Using a teacher residency and induction model to address a teacher shortage in Virginia, USA. In *International Perspectives on School-University Partnerships: Research, Policy and Practice* (pp. 27–40). https://doi.org/10.1007/978-981-99-0807-3_3

Newman, M., & Gough, D. (2020). Systematic reviews in educational research: Methodology, perspectives and application. In Zawacki-Richter, O., Kerres, M., Bedenlier, S., Bond, S., & Buntins, K., *systematic reviews in educational research: Methodology, perspectives and application*. Springer VS. https://doi.org/10.1007/978-3-658-27602-7

Ng, J. (2006). Understanding the impact of accountability on preservice teachers' decisions about where to teach. Urban Review, 38, 353-372.

Nielsen, A. (2016). Second career teachers and (mis) recognitions of professional identities. *School Leadership & Management, 36*(2), 221-245.

Nunnery, J., Kaplan, L., Owings, W. A., & Pribesh, S. (2009). The effects of troops to teachers on student achievement: One State's study. *NASSP Bulletin, 93*(4), 249–272. https://doi.org/10.1177/0192636509359338

OECD. (2005). *Teachers matter : Attracting, developing and retaining effective teachers*. https://doi.org/10.1787/9789264018044-en

OECD. (2016). *PISA 2015 Results (Volume I): Excellence and Equity in Education*. OECD Publishing. https://www.oecd-ilibrary.org/docserver/9789264266490-en.pdf?expires=1712823353&id=id&accname=guest&checksum=6FADD24F13CD4B087EA0601CB09070AE

OECD. (2018). *Effective teacher policies. In Effective Teacher Policies: Insights from PISA*. OECD Publishing. http://dx.doi.org/10.1787/9789264301603-en

Owings, W. A., Kaplan, L. S., Khrabrova, I., & Chappell, S. (2015). Troops to teachers update: Changing, but still pleasing principals with high teaching quality. *NASSP Bulletin, 99*(1), 70-98.

Paine, L., & Zeichner, K. (2012). The local and the global in reforming teaching and teacher education. *Comparative Education Review, 56*(4), 569-583.

Powers, F. W. (2002). Second-career teachers: Perceptions and mission in their new careers. *International Studies in Sociology Of Education, 12*(3), 303–318. https://doi.org/10.1080/09620210200200095

Quigney, T. A. (2010). Alternative teaching certification in special education: Rationale, concerns, and recommendations. *Issues in Teacher Education, 19*(1), 41–58. http://files.eric.ed.gov/fulltext/EJ887294.pdf

Redding, C., & Smith, T. M. (2016). Easy in, easy out: Are alternatively certified teachers turning over at increased rates? *American Educational Research Journal, 53*(4), 1086–1125. https://doi.org/10.3102/0002831216653206

Reyes, A. H. (2003). Does money make a difference for Hispanic students in urban schools? *Education and Urban Society, 35*(4), 363–379. https://doi.org/10.1177/0013124503255191

Richardson, P. W., & Watt, H. M. G. (2005). "I've decided to become a teacher": Influences on career change. *Teaching and Teacher Education: An International Journal of Research and Studies, 21*(5), 475–489. https://doi-org.proxy-ub.rug.nl/10.1016/j.tate.2005.03.007

Ronfeldt, M., & McQueen, K. (2017). Does New Teacher Induction Really Improve Retention? *Journal of Teacher Education, 68*(4), 394–410. https://doi.org/10.1177/0022487117702583

Ruitenburg, S. K., & Tigchelaar, A. E. (2021). Longing for recognition: A literature review of second-career teachers' induction experiences in secondary education. *Educational Research Review, 33*, 100389.)

Sass, T. R. (2011). Certification requirements and teacher quality: A comparison of alternative routes to teaching. In *CALDER Working Paper: Vol. No. 64*. https://caldercenter.org/sites/default/files/conferences/5th/Sass_Certification-Requirements.pdf

Schmidt, W. H., Burroughs, N. A., Houang, R. T., & Cogan, L. S. (2018). The role of content knowledge in mathematics teacher preparation: A study of traditional and alternative teacher preparation in Texas. *Journal of Teacher Education, 71*(2), 233–246. https://doi.org/10.1177/0022487118805989

Shwartz, G., & Dori, Y. J. (2020). Transition into teaching: Second career teachers' professional identity. *Eurasia Journal of Mathematics, Science and Technology Education, 6*(11), 1–19. DOI: https://doi.org/10.29333/ejmste/8502

Smith, Z. K. (2020). *Alternative Teacher Licensure from the Perceptions of K-12 Public School Administrators: A Case Study* (Doctoral dissertation, Northcentral University).

Sterling, D. R., & Frazier, W. M. (2011). Setting up uncertified teachers to succeed. *Phi Delta Kappan, 92*(7), 40–42. https://doi-org.proxy-ub.rug.nl/https://www.kappanmagazine.org/content/92/7/40.ab-stract)

Thomas, M. A. (2017). 'Policy embodiment': Alternative certification and Teach For America teachers in traditional public schools. *Teaching and Teacher Education, 70*, 186–195. https://doi.org/10.1016/j.tate.2017.11.011

Thomas, L., Tuytens, M., Devos, G., Kelchtermans, G., & Vanderlinde, R. (2019). Unpacking the collegial network structure of beginning teachers' primary school teams : a mixed method social network study. In D. Froehlich, M. Rehm, & B. Rienties (Eds.), *Mixed methods social network analysis: Theories and methodologies in learning and education* (pp. 139–158). https://doi.org/10.4324/9780429056826-14

Tigchelaar, A., Brouwer, N., & Vermunt, J. D. (2010). Tailor-made: Towards a pedagogy for educating second-career teachers. *Educational Research Review, 5*(2), 164–183. https://doi.org/10.1016/j.edurev.2009.11.002

TNTP. (2021). Missing Out: Arkansas' Teacher Shortage and How to Fix It. In *TNTP*.

Tournaki, N., Lyublinskaya, I., & Carolan, B. V. (2009). Pathways to Teacher Certification: Does It Really Matter When It Comes to Efficacy and Effectiveness? *Action in Teacher Education, 30*(4), 96–109. https://doi.org/10.1080/01626620.2009.10734455

Trevino, A. (2013). *The effectiveness of alternative certification teachers versus traditionally trained teachers in three school districts in Texas on Hispanic students' scores in 9th grade algebra I: What leaders should know* [PhD Dissertation]. University of Texas-Pan American.

Tuttle, C. C., Anderson, T., & Glazerman, S. (2009). *ABCTE teachers in Florida and their effect on student performance*. Mathematica Policy Research, Inc.

UNESCO Institute for Statistics. (2016). *UIS FACT SHEET OCTOBER 2016*, No. 39 [Report]. https://uis.unesco.org/sites/default/files/documents/fs39-the-world-needs-almost-69-million-new-teachers-to-reach-the-2030-education-goals-2016-en.pdf

UNESCO & International Task Force on Teachers for Education 2030. (2024). *Global report on teachers: Addressing teacher shortages and transforming the profession*. United Nations Educational, Scientific and Cultural Organization. https://doi.org/10.54675/FIGU8035

Wall, J. J. (2009). *Alternatively certified and traditionally certified secondary school mathematics teachers' student success on the Missouri Assessment Program* [PhD Dissertation]. University of Missouri-Kansas City.

Watters, J. J., & Diezmann, C. M. (2015). Challenges confronting career-changing beginning teachers: A qualitative study of professional scientists becoming science teachers. *Journal of Science Teacher Education, 26(2), 163–192.* https://doi.org/10.1007/s10972-014-9413-0

Watts, D. (1986). Alternate routes to teacher certification: A dangerous trend. *Action in Teacher Education, 8*(2), 25–29. https://doi.org/10.1080/01626620.1986.10519288

Wenglinsky, H. (2000). Teaching the teachers: different settings, different results. In Policy Information Report. Educational Testing Service. https://www.ets.org/Media/Research/pdf/PICTT.pdf

Williams, J. (2013). *Constructing new professional identities: Career changers in teacher education*. Brill.

Wright, K. (2020). Comparison of pedagogical knowledge of traditional and alternate routes to teacher certification. *Journal of Graduate Education Research, 1*(1), 5. https://scholarworks.harding.edu/jger/vol1/iss1/5

Zeichner, K. M., & Schulte, A. K. (2001). What we know and don't know from peer-reviewed research about alternative teacher certification programs. *Journal of Teacher Education, 52*(4), 266-282. https://doi.org/10.1177/0022487101052004002

Zhang, G., & Zeller, N. (2016). A longitudinal investigation of the relationship between teacher preparation and teacher. *Teacher Education Quarterly, 43*(2), 73–92.

Zumwalt, K. (1991). Theme: Alternative approaches to teacher education: Alternate routes to teaching: Three alternative approaches. *Journal of Teacher Education, 42*(2), 83-92. https://doi.org/10.1177/002248719104200202

Zumwalt, K. (1996). Simple answers: Alternative teacher certification. *Educational Researcher, 25*(8), 40-42. https://doi.org/10.3102/0013189X025008040

Appendix

Type of Education Discussed in Studies

Study	Special Education	Pre-primary Education	Primary Education	Lower Secondary Education	Upper Secondary Education
Owings et al. (2015)		X	X	X	X
Schmidt et al. (2019)		X	X	X	X
Darling-Hammond (2001)			X	X	X
Donaldson (2012)			X	X	X
Backes et al. (2018)			X	X	X
Nunnery et al. (2009)			X	X	X
Napoli et al.(2023)			X	X	X
Wall (2009)				X	X
Reyes (2003)				X	
Trevino (2013)					X
Mitchell (2011)	X		X	X	X
McKenna et al. (2020)	X			X	X
Quigney (2010)	X				
Hanna and Gimbert (2011)*					

* Hanna and Gimbert (2011) do not specify an educational type or level in their study.