

Teachers' academic achievement: evidence from Swedish longitudinal register data

Tarja Alatalo, Åse Hansson & Stefan Johansson

To cite this article: Tarja Alatalo, Åse Hansson & Stefan Johansson (2021): Teachers' academic achievement: evidence from Swedish longitudinal register data, European Journal of Teacher Education, DOI: [10.1080/02619768.2021.1962281](https://doi.org/10.1080/02619768.2021.1962281)

To link to this article: <https://doi.org/10.1080/02619768.2021.1962281>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 04 Aug 2021.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

Teachers' academic achievement: evidence from Swedish longitudinal register data

Tarja Alatalo ^a, Åse Hansson ^b and Stefan Johansson ^b

^aSchool of Teacher Education, Department of Educational Work, Dalarna University, Falun, Sweden;

^bDepartment of Education and Special Education, University of Gothenburg, Gothenburg, Sweden

ABSTRACT

The difficulty recruiting competent teachers is widespread, and the status of the teaching profession is on the decline. Sweden is just one country with these problems. Using longitudinal register data for every teacher in Sweden born between 1972 and 1998, the present study investigates changes in teachers' own school grades to clarify patterns of recruitment to the teaching profession. The main methods were regression analysis and descriptive statistics. Results showed a significant decline in teachers' grade average between 1996 and 2016, with certified teachers having a higher grade average than uncertified teachers throughout this period. Grades of primary school teachers were lower compared with those of secondary school teachers. Higher grade average for secondary school teachers of natural science subjects compared with teachers of other subjects was also observed. The decline in teachers' grades is a factor characterising changed recruitment patterns and one likely to affect teacher quality.

ARTICLE HISTORY

Received 4 December 2020

Accepted 24 July 2021

KEYWORDS

Teachers' final grades; compulsory school; status of the teaching profession; recruitment; teacher quality

Introduction

Many countries lack competent teachers; indeed, the OECD (2018) recently reported that 29% of all 15-year-olds attended schools with a significant teacher shortage. In recent years, it has become well-established that recruitment to teacher education has not met needs and the number of teacher dropouts has increased (e.g. Lynch et al. 2016; Swedish Higher Education Authority 2017). How to retain quality teachers and attract motivated, high-achieving candidates to the teaching profession has been a concern of most OECD countries in recent decades (Guerriero 2017; Teresa and Judith 2018). Sweden is one of these countries: it has had serious problems recruiting certified teachers (Statistic Sweden 2019).

In addition to natural variations in student cohorts and teacher retirement, a changed recruitment base and diminished status of the profession may explain the recruitment problems. A growing proportion of students with university qualifications has enlarged the recruitment base in Sweden; the proportion of the cohort attending upper-secondary school has increased from 90 to 98% over the past four decades; and

CONTACT Stefan Johansson  stefan.johansson@gu.se  Department of Education and Special Education, University of Gothenburg Gothenburg

*The authors contributed equally to this work and are listed in alphabetical order.

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

an increasing number have the necessary qualifications for admission to teacher education (Statistic Sweden 2019). However, besides this change in the recruitment base, the change in status could also explain the recruitment problems since the status of the profession relates strongly to teacher supply (Eurydice 2018). Globally, there has been a demonstrated decline in the status of the profession (OECD 2005), and since the 1960s, it has become dramatically less prestigious to be a teacher (Hargreaves 2009).

Recruitment problems affects teacher quality. Teacher quality comprises many factors, a significant one being teachers' own school achievement, which will be the focus of the present study. Since the early 1990s, the achievements of teacher education students in Sweden, in terms of final grades from upper-secondary school, have declined significantly more than those of other comparable student groups (Bertilsson 2014). Student teachers also have increasingly lower grades than students in other higher education programmes (Swedish Higher Education Authority 2017). Further, early dropouts from teacher education are more common than from other higher education programmes, while students with the lowest grades from upper-secondary school dominate among dropouts (Swedish Higher Education Authority 2017). Teacher quality, in terms of prior knowledge, thus seems to have changed over time.

Impaired student achievement and increased school segregation are problems, both internationally and in Sweden (Holmlund et al. 2014; Mullis, Martin, and Loveless 2016; Hansen, Kajsa and Gustafsson 2016). Pedagogical segregation is also a problem, meaning that children from disadvantaged backgrounds have less access to competent teachers (Borman and Kimball 2005; Chudgar and Luschei 2016; Hansson and Gustafsson 2016). Competent teachers are key to addressing these problems.

While it is known that there are problems recruiting to the teaching profession and that the grades of student teachers are declining (e.g. Bertilsson 2014), less is known about the academic achievement of employed teachers. Since many student teachers drop out, one may hypothesise that it is the more able students who complete their teacher education and enter the profession. We seek to fill a knowledge gap by extending previous investigations to focus on the changes of working teachers' school achievement. In the present study, we will provide a picture of the academic achievement of teachers for the period 1996–2016 by means of analyses of a longitudinal teacher register. At an international level, such investigation is unique.

Teacher quality and the status of the profession

Teacher quality can be defined as 'a teacher's ability to realise desired outcomes – that is, to effectively educate his or her students' (Rice 2008, 154). Despite objections to one-sided measurable abilities, teacher quality is highly associated with content knowledge in a subject domain, as demonstrated by, for example, test scores in subject matter knowledge (Wayne and Youngs 2003; Zumwalt and Craig 2005). These indicators can be identified by, for example, grades or different test scores on intelligence tests and standardised achievement tests within different academic domains (Svensson 1971). However, teacher quality is also determined in terms of profession-specific characteristics, indicated by a large number of background variables (Anderson et al. 1995; Shulman 1998).

Occupational status, on the other hand, is characterised by standardised classifications usually related to level of education or perceptions and values of the profession's status (Svensson 2003). Specific for the teaching profession are the quality of applicants, specialised knowledge, initial teacher education, accountability and professional development (Guerriero 2017). These status characteristics overlap with the teacher quality characteristics described above. Further, the perceptions teachers themselves have of their status are influenced by government reforms, professional autonomy, working conditions and pay (Hargreaves 2007), as well as by recognition for good work (Price and Weatherby 2018). The status of the teaching profession seems also to relate to the status of other professions (Hargreaves and Fullan 2012).

Career choice and recruitment

It is not only the perception an individual has of the teaching profession that affects their likelihood of entering it but also their own schooling (Kleickmann et al. 2013). In a literature review, Guarino, Santibanez, and Daley (2006) concluded that college graduates in the U.S. with higher academic ability were less likely to enter the teaching profession than others and were more likely to leave it. An individual's own schooling can also affect teacher quality because schooling has a bearing on both content and pedagogical knowledge (Kleickmann et al. 2013).

The attractiveness of the teaching profession is relative since teacher recruitment and retention depend on alternative opportunities that are available (Guarino, Santibanez, and Daley 2006). The attractiveness can also be influenced by government reforms, professional autonomy, working conditions and pay (Hargreaves 2007). Sweden underwent extensive school reforms in the early 1990s when responsibility for compulsory education was decentralised (SOU 2014:05 2014, 5). External control increased, and teachers' autonomy and influence over their work decreased. A further consequence of the reform was the negative effect on teachers' salaries (SOU 2014:05 2014:5; Stenlås 2009). Stenlås (2009) stated that the reforms demonstrated a low level of respect for the professionals' knowledge, experience and values. Wermke and Forsberg (2017) meanwhile argue that the standardisation of schooling, to which the reforms have contributed, has restricted teacher autonomy. Since the reforms, the social recruitment to teacher education has changed; it has become more difficult to recruit male students and motivated students (Stenlås 2009). Taken together, the Swedish reforms may have affected how teachers themselves value the profession, leading to changes in recruitment patterns, where student teachers no longer have high grade averages from non-tertiary schooling, which was the case prior to the reforms.

Grades as an indicator of competence

Grades have high predictive validity for students' future academic performance, and they have an advantage over standardised test scores in this respect (Cliffordson 2008; Sawyer 2013). Although test-scores and grades correlate substantially, they are far from being equivalent. Lotz, Schneider, and Sparfeldt (2018) state that both tests and grades are influenced by non-ability aspects, such as gender, learning behaviour, personality and motivational variables. Sawyer (2013) showed that grades were better at

predicting successful entry to university compared to tests in cases where there was low competition for places, which is the case with Swedish teacher education. In a study from the U.S., Bowers, Sprott, and Taff (2013) found that grade point average (GPA) was a significant predictor of school failure, yet the usefulness of grades to predict school success varies between grading systems. In Sweden, criterion-referenced grades were introduced in 1994, and these have been better predictors of success in higher education than their predecessors, namely norm-related grades (Cliffordson 2008) partly because they are based on a larger number of individual assessments.

Research on teachers' academic achievement schooling

Internationally, it has been difficult to demonstrate a direct connection between teachers' grade average at school and the academic achievement of their students (Baier et al. 2019; Harris and Sass 2011; Kunter et al. 2013). In Swedish studies, it has been difficult to demonstrate the overall effects of the decline in teacher ability (Grönqvist and Vlachos 2008). Other studies have emphasised that teachers' academic achievement is an important characteristic of teacher quality (Harris and Sass 2009; Kukla-Acevedo 2009). Harris and Sass showed that the positive effects of teachers own academic achievement were conditioned by teachers' subject matter knowledge and teaching skills. Kukla-Acevedo, on the other hand, argued that only the overall grade average, not the subject-specific mathematics performance, could predict performance in mathematics of 5th grade students. Further, Meroni, Vera-Toscano, and Costa (2015) showed that in 18 countries, teachers' literacy and numeracy skills had a bearing on students' performance in reading and mathematics. Using data for 31 countries from the Programme for International Assessments of Adult Competencies (PIAAC) and the Programme for International Student Assessment (PISA), Hanushek, Piopiunik, and Wiederhold (2018) addressed the differences between countries in terms of the cognitive skills (measured by tests in numeracy and literacy) of teacher education applicants. The study was based on the pronounced differences between the education systems of certain countries: for example, Singapore, Finland, and Korea recruit their teacher candidates from the top third of the academic cohort while in the U.S., only 23% of new teachers are from the top third. Hanushek et al. found that differences in teacher numeracy and literacy skills between countries were strongly associated with international differences in student performance.

In Sweden in recent years, there has been a decline in both applicant quality, which is important for teacher quality and perceptions of the teaching profession, and the tendency to enter the teaching profession (Bertilsson 2014). Bertilsson identified a decline in the 'school capital' of student teachers, measured by final grades from upper-secondary education. Those who intend to become teachers in the lower grades have the lowest school capital, but the largest decrease has been among those who aim to become subject-specific teachers – for example, mathematics (Bertilsson 2014). However, the trend may have changed since 2011 with the establishment of new requirements for teacher certification (Proposition 2010/11:20). The certification reform is expected to raise the status of the teacher profession, and thus contribute to an increase in recruitment quality.

Summary and research questions

This study investigates trends in teachers' final grades from compulsory school (school year 9) between 1996 and 2016. Because grades are subject to inflation (Hansson and Gustafsson 2016), we will calibrate them to ensure comparability over time. Teachers' grades from the nine-year compulsory school are more comparable across a group of individuals than are grades from upper-secondary school. This is because grades from upper-secondary school are tracked – that is, individuals choose different academic programmes that comprise different courses, meaning that upper-secondary grade average scores are likely to be for different subjects. In this study, the following research questions are addressed:

- (1) What are the trends in the final grade averages from compulsory school of teachers in Swedish schools?
- (2) What are the differences in grade average between certified and uncertified teachers?
- (3) What are the differences in grade average between primary school teachers and secondary school teachers?
- (4) How has the grade average changed for teachers in different subjects?

Data and method

The many school reforms in Sweden have meant considerable changes for the teaching profession in recent decades. Teacher education in Sweden has also been reformed several times in recent years, resulting in varying focus on content knowledge and pedagogical content knowledge (Lindblad et al. 2002). In 1962, the compulsory nine-year school system was introduced, which meant changes to teacher education. Teacher education applicants selected one of four strands: primary school years (1–3), middle school years (4–6), or specific subjects in upper-middle or secondary school for specific school years (7–9 and 10–12). In 1988, a new teacher education system was introduced: candidates could choose between primary and middle grades 1–7 or the upper grades 4–9. In 2001, teacher education was reformed yet again, and changes that meant increased flexibility in teacher education were made with respect to both grade and subject. In 2011, the pendulum then swung towards increased focus on content knowledge and more specificity with respect to grade level. Applicants to teacher education were once more to teach by grade: 1–3, 4–6 and 7–9.

Teacher education is offered by many higher education institutions in Sweden, with some 13,000 admissions each year (Swedish Higher Education Authority 2017). Since the 2011 teacher education reform, the number of eligible first-time applicants to teacher education programmes has increased steadily, albeit from a low level. There are few applicants per available place in several teacher programmes, which means admission for a large proportion of qualified first-choice applicants (Swedish Higher Education Authority 2017). Moreover, the drop-out rate is higher in teacher education than in most other higher-education programmes – about 36% – and the drop-out rate is higher for students with lower grade averages from upper-secondary school. In Sweden, as well as internationally, there have been difficulties recruiting qualified teachers, and there are signs

of a decline in student teachers' basic skills (Bertilsson 2014; Guerriero 2017; Statistic Sweden 2019). Much suggests that teacher quality are affected by teachers' prior knowledge (e.g. Kleickmann et al. 2013). Given the general decline in student achievement since the turn of the millenium, it is crucial to explore changes over time in teachers' prior knowledge.

Subjects

To shed light on Swedish teachers' final grades from compulsory school, we used data from the Swedish teacher register provided by Statistics Sweden. This data shows the complete population of teachers working in Swedish schools from 1996 to 2016. The current study was carried out as part of a large research project that was granted data access until 2016; therefore, we were unable to extend our investigation to include later years. The available data includes information about position, subjects taught and certification. The register forms part of the national follow-up system for the school sector run by the Swedish National Agency for Education and aims to provide a comprehensive picture of educational activities and support for follow-up and evaluation at national and regional levels. Data is collected annually and relates to school staff with educational duties (teachers, assistant teachers and other educational staff, leisure teachers, leisure instructors, school leaders, and study and career counsellors) in the school forms covered by the agency's National Monitoring System. The information about teachers and administrative personnel is most often provided by school principals.

In addition to the teacher register data, a set of variables from The Gothenburg Educational Longitudinal Database (GOLD) was linked to the register data. GOLD comprises longitudinal register data on all individuals in Sweden from the day they turn 16. The first GOLD cohort were born in 1972. GOLD includes education-related information such as grades, national test results, the Swedish Scholastic Aptitude Test and higher education credits for all individuals. Both the teacher register and GOLD are stored by each person's personal identification number, thus facilitating a link between the two databases. This link, together with the longitudinal design of the register, makes the data comparatively unique in an international context and allows us to describe general prerequisites of the teacher workforce in compulsory school 1996–2016.

The current study is based on the 'GOLD-teachers' and thus includes teachers born between 1972 and 1998. [Table 1](#) presents the number of GOLD-teachers. As a reference, we include the total number of teachers per year in Swedish compulsory school between 1996 and 2016.

As evident in [Table 1](#), the number of GOLD-teachers has increased over time. In 1996, GOLD only included teachers up to 24 years of age: this changed in 2016 to include teachers up to 44 years of age. Because of the uneven distribution of teachers in respective years, we have chosen to analyse those who were new to the profession for each year. Most commonly, teachers entered the teaching profession between the ages of 24 and 26.

Table 1. Number of GOLD-teachers and the total number of teachers, per year. Weighted to full-time equivalents.

Year	Total number of teachers enrolled in school years 1-9	Number of teachers (GOLD) enrolled in school years 1-9 born 1972-1998	Total number of new teachers (GOLD) per year in school years 1-9 born 1972-1998
1996	76425	1431	1146
1997	76644	2997	1992
1998	79392	5355	3080
1999	77160	7556	4270
2000	80433	9884	4959
2001	83154	11892	5135
2002	85415	13614	5364
2003	86576	14809	4748
2004	85353	15303	3717
2005	84351	16035	3512
2006	82636	16814	3655
2007	80615	17314	3269
2008	78768	18289	3709
2009	75234	18483	2684
2010	75809	20316	4080
2011	78232	23637	4461
2012	77056	24285	3953
2013	75415	25875	4246
2014	77798	28610	4400
2015	79740	31591	4851
2016	83899	35470	6095

Variables

Teachers' school achievement

To examine teachers' final grades from compulsory school, we explored their grade average for school year 9. There have been different grading systems for the different cohorts (1972–1998). In Sweden, a norm-referenced grading system was replaced by a criterion-referenced system in 1994. Thus the criterion-referenced system was used for the cohort born in 1981 and later, while the norm-referenced grading system was used for the earlier cohorts.

Because of the different grading systems and the fact grades have been subject to grade inflation (see, for example, Guarino, Santibanez, and Daley 2006; Cliffordson 2004), every student was assigned a percentile-transformed grade. Percentiles were computed separately for the grades of each cohort. For each cohort, the grade average had a mean of about 50 and an SD of about 28 (see Svensson and Nielsen 2008). Basically, to be in the 50th percentile means a teacher had a mean grade average in Grade 9.

In addition to the grade average scores, we made use of information about *year*, *teachers' age*, *teachers' certification status*, *grade-level (1–9)* and *the subject taught*. We investigated differences between teachers of subjects in natural science, social science and modern languages. Typically, natural science teachers teach a combination of subjects – for example, mathematics, biology, chemistry and physics. The social science teacher commonly teaches Swedish language and civic education, while modern language teachers often teach more than one foreign language, usually English or French, and often Swedish.

Analytical approach

To explore overall trends, we carried out a series of regression analyses. The analysis was successively extended with variables (year, age, certification, etc.) that may explain the trends from 1996 to 2016. We mainly used dichotomous variables; however, we centred continuous variables to facilitate a substantive interpretation of the constant (intercept) and the unstandardised regression coefficients. The year variable was centred so that year 1996 was set at 0. Age was centred so that those aged 24 were set at 0. Certain teacher groups we investigated in more detail using mean comparisons and graphical representation. Data was organised in long format, and was prepared and analysed using SPSS 26.0.

Results

Teachers' school achievement

To address both the knowledge of newly recruited teachers as well as patterns in recruitment to the teaching profession, we first examined the final grades from compulsory school (Grade 9) of new teachers born between 1972 and 1998 in a series of regression analyses. After these analyses, we explain some of the results in more detail.

Overall trends

The first step in the analysis involved describing the general trend from 1996 to 2016 for the complete pool of teachers (born 1972–1998). The results are presented in [Table 2](#) below. In model 1, we regressed GPA on year and found that for each year (1996 = 0) the GPA decreased on average by about 0.7 points. The constant (71.02) represents the predicted average GPA for teachers in 1996. In model 2, we added the centred age variable. Keeping the year variable constant, the average decline is about 0.8 GPA points with one year increasing age. The constant represents the expected GPA for a 24-year-old teacher in 1996. To examine if the regression lines for different ages are parallel across time-points, we added the interaction term 'int_age_year' in model 3. The coefficient for the interaction term (0.06) is positive; thus, the later in the trend (e.g. 2016), the greater the expected differences between GPA scores are for individuals of different ages. This is not surprising given that there are many more age cohorts in 2016 than in 1996.

In the following models (4–6), we added a dummy variable for certification status (1 = cert, 0 = no cert). We included interactions of cert, year and age in subsequent models to investigate whether certification was particularly salient at certain points in time. In model 4, we noted that certification predicted a 10-point increase in the GPA score. With the interaction terms taken into account, the effect of certification amounted to 17 score points ($b = 17.36$), which reflects the difference for an uncertified and certified 24-year-old in 1996 (age = 0, year = 0). The interaction effects are negative, suggesting that the expected differences in GPA scores between certified individuals are smaller for older teachers and later in the period.

[Insert regression [Table 2](#) about here]

In the next step of the regression (model 7), we included teachers' sex (0 = male, 1 = female), which suggested a higher GPA for female teachers (8.40) while accounting for the other variables. Finally, we added dummy variables for grade level, where primary

Table 2. Regression coefficients.

Variables	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6			Model 7			Model 8		
	B	Beta	C.I. (95%)	B	Beta	C.I. (95%)	B	Beta	C.I. (95%)	B	Beta	C.I. (95%)	B	Beta	C.I. (95%)	B	Beta	C.I. (95%)	B	Beta	C.I. (95%)	B	Beta	C.I. (95%)
Constant	71.02		[70.69, 71.35]	70.81		[70.48, 71.14]	72.02		[71.67, 72.37]	65.13		[64.73, 65.54]	60.93		[60.40, 61.47]	60.88		[60.34, 61.42]	56.31		[55.75, 56.88]	52.05		[51.46, 52.65]
Year	-0.70	-0.18	[-0.72, -0.67]	-0.43	-0.11	[-0.46, -0.40]	-0.54	-0.14	[-0.57, -0.51]	-0.44	-0.11	[-0.47, -0.41]	-0.09	-0.02	[-0.13, -0.04]	-0.08	-0.02	[-0.13, -0.04]	-0.09	-0.02	[-0.13, -0.04]	-0.07	-0.02	[-0.12, -0.03]
Age				-0.83	-0.16	[-0.87, -0.79]	-1.75	-0.34	[-1.85, -1.64]	-2.24	-0.43	[-2.34, -2.13]	-2.30	-0.44	[-2.41, -2.19]	-2.22	-0.43	[-2.36, -2.07]	-2.25	-0.43	[-2.39, -2.10]	-2.23	-0.43	[-2.37, -2.09]
Int_year_age							0.06	0.20	[0.06, 0.07]	0.08	0.26	[0.08, 0.09]	0.09	0.29	[0.09, 0.10]	0.09	0.27	[0.08, 0.10]	0.09	0.27	[0.08, 0.09]	0.08	0.26	[0.08, 0.09]
Cert							10.34	0.21	[10.02, 10.67]				17.36	0.36	[16.69, 18.03]	17.56	0.36	[16.85, 18.27]	15.13	0.31	[14.43, 15.84]	15.89	0.33	[15.19, 16.59]
Int_year_cert										-0.61	-0.18	[-0.67, -0.55]	-0.61	-0.18	[-0.67, -0.55]	-0.63	-0.18	[-0.69, -0.57]	-0.59	-0.17	[-0.65, -0.52]	-0.62	-0.18	[-0.68, -0.56]
Int_age_cert										-0.11	-0.02	[-0.19, -0.04]	-0.11	-0.02	[-0.19, -0.04]	-0.28	-0.04	[-0.49, -0.08]	-0.05	-0.01	[-0.25, 0.16]	-0.23	-0.04	[-0.43, -0.03]
Int_age_year_cert													0.01	0.03	[0.00, 0.03]	0.01	0.03	[0.00, 0.03]	0.00	0.00	[-0.01, 0.01]	0.01	0.03	[0.00, 0.03]
Sex																8.40	0.16	[8.07, 8.74]	8.40	0.16	[8.07, 8.74]	9.17	0.18	[8.84, 9.51]
Secondary																						8.35	0.14	[7.93, 8.76]
Compulsory																						4.67	0.10	[4.34, 5.01]

school teachers were the reference category. Notably, teachers who work in secondary school and at all grade levels (1–9) have a higher GPA than primary school teachers ($b = 8.35$ for secondary school teachers). The constant decreases as more variables are entered into the model. The factors of being uncertified and male, and of working in primary school render a predicted GPA of 52 points. Coefficients for age and year are typically negative (i.e. model 8 $[-2.23/-0.07]$), suggesting a lower GPA still when age and year increase.

Following the 1972 cohort 1996–2016

To shed light on the grade average for certified and uncertified teachers entering the profession at a later age, we selected the cohort born in 1972 for further scrutiny. The trend for these teachers is presented in Table 3. The picture that emerges is that teachers who enter the profession in their mid-20s have higher grades than those entering at a later age. However, older teachers with certification tend to have a better grade average than their counterparts without certification. For example, in 2005, teachers aged 33 with certification have a grade average in about the 60th percentile, while those who are uncertified have a grade average in about the 48th percentile. We also studied teachers who remain uncertified throughout their career. Uncertified teachers in 2010–2012 have a grade average around the 40th percentile, meaning that these teachers have a fairly mediocre grade average, well below the average of the total population. Furthermore, we examined whether there were any differences in the certified teachers' grades. Specifically, we focused on whether teachers with certification when teaching for the first time (the fastest route) had higher grades compared to those who gained certification at a later stage. Generally, teachers who were certified when they started teaching achieved higher grades; however, differences were negligible.

Table 3. GPA scores and standard deviations for newly employed teachers, for three age groups.

Age Year	24–26		27–29		30	
	Mean	SD	Mean	SD	Mean	SD
1996	80.83	16.25				
1997	79.52	16.07				
1998	76.57	18.26				
1999	72.28	20.22	68.30	20.96		
2000	69.75	21.46	63.56	23.24		
2001	69.34	21.53	63.25	23.44		
2002	68.17	21.87	62.22	23.39	56.41	24.83
2003	68.96	21.48	61.81	23.19	56.86	23.78
2004	68.48	20.62	61.59	22.08	60.19	21.91
2005	65.37	20.63	61.04	22.71	55.86	24.32
2006	65.09	21.54	59.55	23.51	56.49	24.90
2007	64.47	22.41	58.47	23.73	54.66	24.09
2008	63.68	23.06	58.92	23.49	55.77	23.71
2009	66.79	22.25	61.04	22.06	54.83	22.41
2010	64.51	22.23	61.31	23.43	56.27	22.17
2011	64.98	21.88	62.41	21.94	59.05	24.55
2012	63.46	22.55	61.74	23.88	61.57	21.50
2013	66.19	21.02	63.61	21.82	60.86	21.75
2014	65.65	21.27	61.53	22.30	59.86	22.92
2015	64.62	21.74	63.38	22.73	57.75	24.71
2016	62.10	23.09	60.89	23.82	60.22	23.92

Grade average for different age groups

To examine changes in grades in more detail, we ran descriptive statistics for the most common ages entering the profession. As previously noted, the most common age to enter the profession in 1996 to 2016 was 24–26. Generally, the newly employed teachers are somewhat older at the end of the period. Therefore, we also selected the age groups 27–29, as well as 30-year-olds. In [Table 4](#), the grade average are presented for all new teachers for each year, divided in relation to different starting ages.

The pattern that emerges in [Table 4](#) shows a pronounced decline as we proceed in time. It can be noted that newly employed teachers had fairly high grades in the first years of our study (1996–2000). For example, to be in the 70th percentile means that grades are clearly higher than average. However, for teachers between 24 and 26, there is a rather linear decline between 1996 and 2016, with the grade average decreasing from 80 to about 55. Teachers who enter the profession aged 30 have an average grade level that fluctuates around the 55–60th percentile. Interestingly, the grade levels of the group entering teaching at the age of 30 change only marginally. This pattern differs from that of teachers in the 24–26 age group, which shows a large decline.

Increasing grade heterogeneity

To investigate the consistency of grade averages for each year, we also calculated the standard deviation for the respective age groups. [Table 4](#) shows how the SD increases over time, especially for the age group 24–26. With respect to their grade average, the newly employed teachers were more homogeneous at the beginning of the period. However, in later years, the teachers' grade average varies more. One interpretation of this may be that in more recent years among the newly recruited teachers, there have been both very high and very low grade averages, which caused the increased spread. However, in more recent years, it is uncommon for newly employed teachers to have high

Table 4. Average GPA for newly employed teachers for birth cohort 1972. Divided by certification status.

YEAR	Teachers with certification (achieved anytime)		Uncertified teachers (until 2016)		Certified first-time		All newly employed teachers	
		N		N		N		N
1996	81.99	470	72.16	63	82.06	386	80.83	533
1997	80.08	454	71.54	84	81.24	342	78.75	538
1998	76.43	475	65.29	127	77.93	309	74.08	602
1999	70.71	469	61.34	163	70.97	330	68.30	632
2000	66.36	395	51.71	220	66.31	210	61.12	615
2001	67.75	292	54.75	168	69.28	161	63.00	460
2002	61.33	284	47.89	164	61.43	181	56.41	448
2003	58.73	225	48.07	121	57.40	149	55.00	346
2004	62.21	154	47.69	76	63.05	110	57.41	230
2005	59.57	130	48.25	73	61.20	95	55.50	203
2006	57.69	142	43.92	80	60.08	97	52.73	222
2007	55.68	111	48.38	60	57.15	77	53.12	171
2008	57.68	99	48.06	66	58.92	51	53.83	165
2009	57.82	76	47.19	39	59.34	57	54.21	115
2010	50.77	96	44.26	42	48.87	74	48.79	138
2011	54.33	89	39.95	28	54.11	74	50.89	117
2012	55.84	67	44.07	31	57.02	57	52.11	98
2013	59.79	68	55.29	34	58.46	61	58.29	102
2014	61.25	43	51.54	34	62.05	38	56.96	77
2015	55.70	43	58.85	36	55.60	37	57.13	79
2016	54.38	44	53.54	53	54.38	44	53.92	97

grades. In 2016, about 19% of newly recruited teachers aged 24 had a grade average at the 80th percentile or above. In 1996, the corresponding number was 63%. When we explore the proportion of teachers with grades lower than total average (< 50 percentile), we observe that in the first few years of the period studied, the proportion was about 10%. At the beginning of the millennium, this share increases, stabilising at around 30% in later years (34% in 2016).

Grade average for teachers of different subjects

To shed light on possible differences and trends relating to teachers of different subjects, we studied secondary school teachers only. The reason for this was that in primary school, many teachers can be said to have a generalist post, whereas the teaching posts of secondary school teachers are more well-defined as they can be categorised as teachers of natural science, social science or modern languages to a higher degree.

As previous analyses revealed, secondary school teachers have somewhat higher grades than primary school teachers. However, their grades are also likely to differ depending on whether they are certified in the subject they teach. [Figures 1 and 2](#) shed light on the grade average for certified and uncertified teachers.

[Figures 1 and 2](#) reveal differences in grades depending on the subject taught. This pattern is relatively similar for both certified and uncertified teachers. Generally, natural science teachers have the highest grades. At the end of the period, these teachers still have a grade average in the 70th percentile. At the beginning of the period, there are only minor differences in grade average for certified teachers in natural science, social science and modern languages. However, differences increase over time. In particular, the grade average of social science teachers decreases.

Summary of findings

The results can be summarised as follows:

- Newly employed teachers' grade average have decreased over a period of 20 years.
- Teachers who gain certification at the age of about 25 have a generally higher grade average than those who start teaching later in life.
- Teachers who enter the profession at the age of 30 have a grade average that fluctuates around the 55–60th percentile for the entire period.
- Teachers without certification have a lower grade average.
- Secondary school teachers have a higher grade average than primary school teachers. This difference increases towards the end of the period.
- For teachers of natural science, the decrease in grade average is less pronounced compared to teachers of social science and modern languages.

Discussion

To shed light on the difficulties recruiting high-performing students to the teacher profession as well as the declining status of the teaching profession, the current study investigated changes in teachers' grade averages over time. The results show that teachers who entered the profession aged 24–26 had a rather linear decline in grade

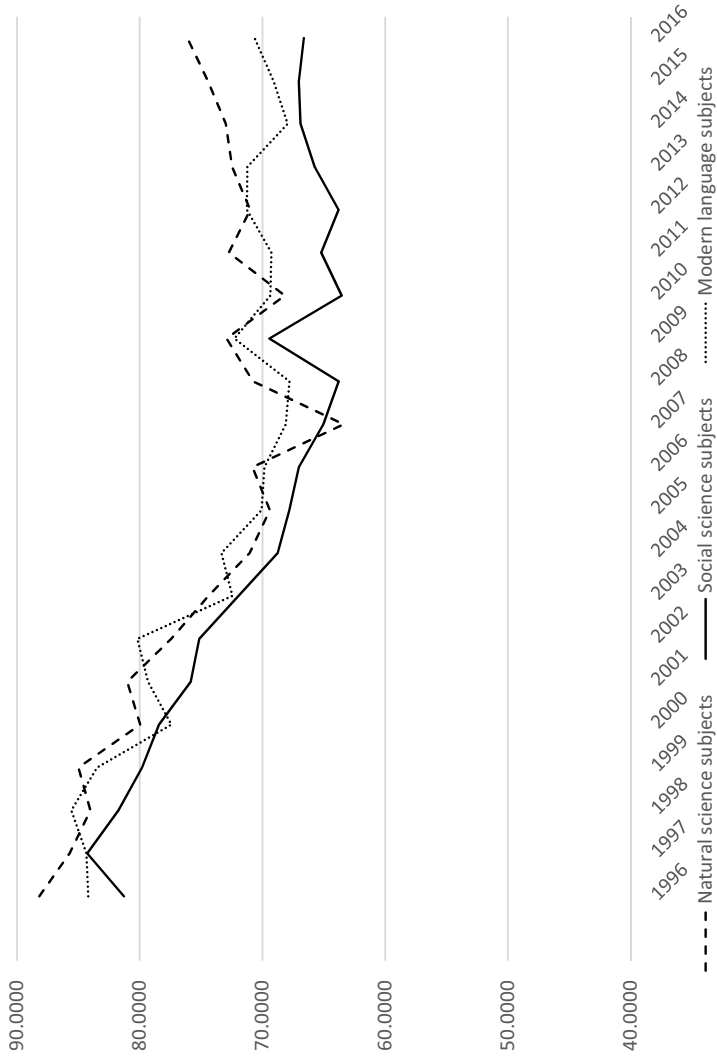


Figure 1. GPA certified teachers, School years 7–9, different subjects.

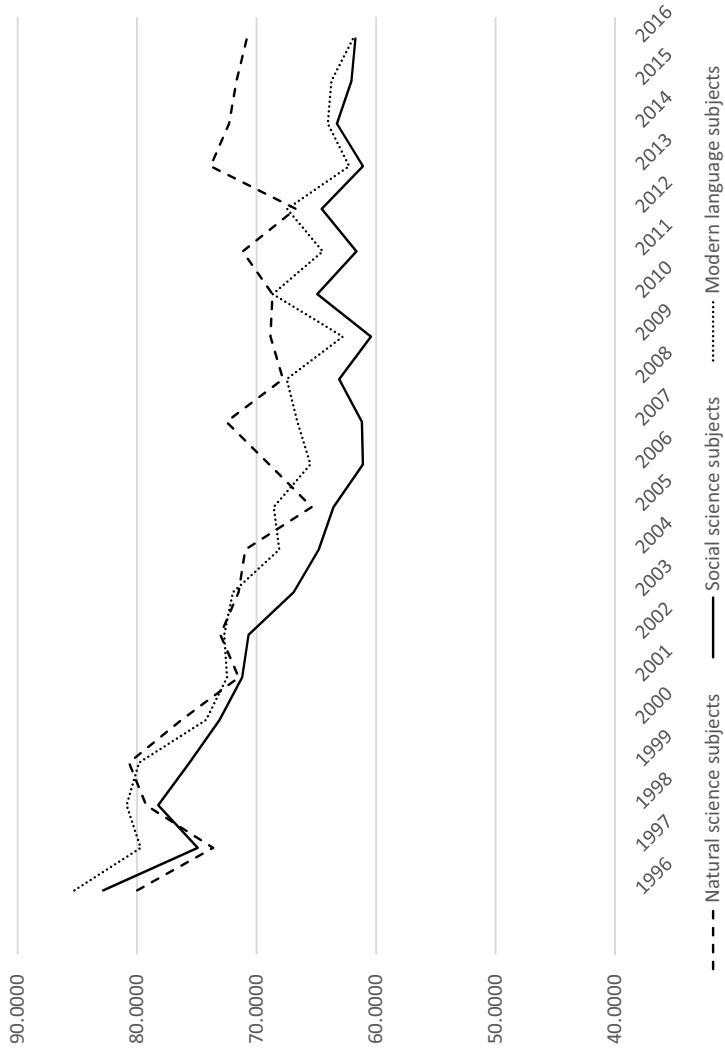


Figure 2. GPA uncertified teachers, School years 7–9, different subjects.

average between 1996 and 2016, declining from the 80th percentile to about the 55th. This downward curve for those entering the profession confirms that the status of the teaching profession may have declined. Further, there are indications of a changed recruitment pattern in that increasingly more individuals in their 30s are new to the profession, likely as a second career choice. The grade average for the older group fluctuated around the 55–60th percentile for the entire period. Results suggest that this is a more homogeneous group with respect to prerequisites, and one that is possibly more resistant to trends in recruitment patterns. Even though teachers who started their teaching career earlier in life had higher grades than those who started later, grade deterioration over time was greater for those who started earlier. Regardless of age upon entry to the teaching profession in 2016, grades are at about the 55th percentile; thus grade averages tend to converge. By and large, our results are in line with prior research (Bertilsson 2014), suggesting changed patterns in recruitment to the teaching profession (Swedish Higher Education Authority 2017). Prior research indicates that undergraduates with higher academic ability (i.e. test scores or grades) are less likely to enter the teaching profession (Bertilsson 2014; Guarino, Santibanez, and Daley 2006); this in turn, together with the decline in professional status (SOU 2014:05 2014, 5), can result in impaired teacher quality (e.g. Kleickmann et al. 2013; Harris and Sass 2009; Kukla-Acevedo 2009).

The group of certified teachers has a substantially higher grade average compared to the uncertified group. For certified teachers entering the profession aged between 24 and 26, however, the grade average has declined significantly over the last two decades, from over the 80th percentile to the 65th. Further, since the mid-2000s, primary school teachers have generally had a lower grade average than secondary school teachers, a finding that aligns with previous surveys (Swedish Higher Education Authority 2017). Uncertified teachers employed at secondary school had reasonably high grades throughout the period, whereas uncertified primary school teachers did not. The disparity in teachers' grade averages between primary and secondary school could be due to the onerous workload in socially segregated schools. Here, primary schools are particularly vulnerable since, unlike their upper-secondary counterparts, teachers have to teach all subjects while also dealing with all matters related to students' schooling. One implication of the lower grade average for teachers in primary school might be the increasing difficulties students have acquiring crucial basic skills (see Meroni, Vera-Toscano, and Costa 2015). For example, quality teaching in literacy in the lower grades is particularly important for children at risk of school failure (Moats 2009; Myrberg and Lange 2006).

Finally, the grades of secondary school teachers differed by the subject they taught and whether or not they were certified. Teachers of natural science had the highest grades: the 85th percentile at the beginning of the period and the 70th at the end. At the beginning of the period, there were only minor differences in grade average for certified teachers in natural science, social science and modern languages. At the end of the period, however, the gap had widened to about 10 percentiles between teachers of natural science, social science and modern languages. The huge variation in grade average for the subject-specific teacher-education programmes noted above indicates a difference in the profession's attractiveness for different subject-specific teachers. The current results indicate higher status for teachers of natural science.

Changes in Sweden that have affected teacher recruitment

There may be several reasons as to why, towards the end of the period, the profession does not attract students with equally high academic capacity as at the beginning. Parallel to the significant changes in the organisational basis of Swedish compulsory school, the variation between schools in student composition has increased (Holmlund et al. 2014), and this has affected the work environment and presented significant challenges for teaching, which in turn may have affected the status of the profession. The reforms have also reduced teachers' autonomy, which has been shown to diminish confidence in teachers' competence (see Blömeke and Gustafsson 2017). The growing problem recruiting studious students to teacher education (Stenlås 2009) may thus be an expression of the declining status of the profession.

Further, student teachers have increasingly lower grades in comparison to students in other higher education programmes besides those in subject-specific teacher-education programmes (Swedish Higher Education Authority 2017). This indicates the high attractiveness of these subject-specific teacher-education programmes. Since a higher proportion of each birth cohort has continued to university (12% 1996, 25% 2016), more students with a lower grade average have gained admission to higher education. There is no question that more teachers are needed, yet quality needs to improve. A recently published government proposal (Ministry of Education and Research 2021) states that the quality of teacher education needs to improve by means of future reforms. The proposal suggests stricter requirements for the primary teacher and subject-specific teacher-education programmes with more teacher-led hours, stronger connection between theory and practice, and increased focus on methodology. At the same time, shorter supplementary education has been proposed for applicants who already hold a degree. This education will comprise 75 credits for primary school student teachers and 60 credits for subject-specific student teachers, including 20 credits of field training. Many of the qualifications that are relevant for application eligibility to the proposed complementary teacher education programme require higher grades than to teacher education. Individuals eligible for the complementary education for the subject combination L1 (Swedish), L2 (English) and social studies in primary school should hold a previous degree in, for example, journalism or economics. For the subject combination mathematics, natural science and technology in primary school, a previous degree in, for example, mathematics, molecular biology or forest science is adequate. It should be noted that based on their qualifications, this group of applicants is probably well qualified in terms of grade average, most having higher prerequisites than those commencing full programme teacher education. However, a question that arises is whether the complementary teacher education provides enough content knowledge in, for example, literacy or mathematics in primary school. For skilled reading and writing instruction, the teacher's knowledge needs both depth and breadth (Moats 2009; Myrberg and Lange 2006). Also in mathematics, the teacher needs content knowledge to be able to deliver cognitively activating instruction that also provides individual support for students' learning, and pedagogical content knowledge of mathematics is inconceivable without content knowledge (e.g. Baumert et al. 2010). Increasing the number of teachers while at the same time increasing teacher quality presents a great challenge.

Limitations and further research

Our investigation shows a steadily decreasing grade average in the teacher workforce; however, how this affects teacher quality and effectiveness is not clear. While the percentile scores we used do not suffer from grade inflation, they do indicate relative relationships between grades for particular years. Thus to be in the 50th percentile in 1996 does not imply exactly the same knowledge level in 2016. Hypothetically, deteriorating grade averages do not necessarily mean actual knowledge impairment. However, data from international large-scale assessments suggest that school achievement is on the decline since the 1970s (e.g. Gustafsson and Hansen 2009), which rather suggests that a percentile score of 50 at the end of the period would represent a lower level of knowledge than at the beginning.

Furthermore, since we only have information about individuals born between 1972 and 1998 we cannot provide the full picture of teachers in Sweden. As the number of teachers increases over time, we choose to focus on the age groups of teachers who are new to the profession every year to achieve better comparability across years.

The recruitment problem implies that there are many uncertified teachers in primary schools, and this study shows that these teachers have lower grades than certified teachers. The implications of this are generally worrying for the quality of teaching in school years 1–6. If there is a teacher opportunity gap, which has been shown in Sweden previously (Hansson and Gustafsson 2016) it may well increase the difficulties disadvantaged students have to be successful in school (see Meroni, Vera-Toscano, and Costa 2015).

Finally, among an array of characteristics depicting teacher quality, teachers' prior knowledge is one that can affect students' progress in school. In light of the deterioration of students' school performance in Swedish compulsory school in recent decades, it would be justified to consider the impact of Swedish teachers' school performance on students' school progress as an important area for future research.

Acknowledgments

We are grateful for comments on previous drafts of the paper by Professor Jan-Eric Gustafsson and for help with data preparation by database manager Bo Nielsen, both University of Gothenburg, Department of Education and Special Education. We appreciate the valuable comments received by the anonymous referees.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Vetenskapsrådet [2016-03636].

Notes on contributors

Tarja Alatalo is professor of Educational Work at School of Teacher Education, Dalarna University. Her research focuses on reading in school and reading motivation among students in sixth and

ninth grades, teacher qualifications in the subjects of Mathematics and L1 (Swedish) in compulsory school in a longitudinal perspective, and reading aloud and writing instruction in Nordic preschools.

Åse Hansson is associate professor of Subject Didactics at Department of Education and Special Education, Gothenburg University. Her research interest includes mathematics teaching and determination and effects of teacher competence from an equality perspective.

Stefan Johansson is associate professor at the University of Gothenburg, Department of Education and Special Education. His research interests lie mainly in the field of educational assessment and school effectiveness research. He has previously investigated how teacher competence can be operationalised and the effects of teachers on student achievement.

ORCID

Tarja Alatalo  <http://orcid.org/0000-0002-2130-4797>

Stefan Johansson  <http://orcid.org/0000-0002-2051-7248>

References

- Anderson, L. M., P. C. Blumenfeld, P. R. Pintrich, C. M. Clark, R. W. Marx, and P. L. Peterson. 1995. "Educational Psychology for Teachers: Reforming Our Courses, Rethinking Our Roles." *Educational Psychologist* 30 (3): 143–157. doi:10.1207/s15326985ep3003_5.
- Baier, F., A.-T. Decker, T. Voss, T. Kleickmann, U. Klusmann, and M. Kunter. 2019. "What Makes a Good Teacher? the Relative Importance of Mathematics Teachers' Cognitive Ability, Personality, Knowledge, Beliefs, and Motivation for Instructional Quality." *British Journal of Educational Psychology* 89 (4): 767–786. doi:10.1111/bjep.12256.
- Baumert, J., M. Kunter, W. Blum, M. Brunner, T. Voss, A. Jordan, and Y.-M. Tsai. 2010. "Teachers' Mathematical Knowledge, Cognitive Activation in the Classroom, and Student Progress." *American Educational Research Journal* 47 (1): 133–180. doi:10.3102/0002831209345157.
- Bertilsson, E. 2014. *Skollärare: Rekrytering till Utbildning Och Yrke 1977–2009*. [School Teachers: Educational and Professional Recruitment 1977–2009]. Uppsala: Acta Universitatis Upsaliensis.
- Blömeke, S., and J.-E. Gustafsson, eds. 2017. *Standard Setting in Education. The Nordic Countries in an International Perspective*. Cham: Springer International Publishing.
- Borman, G. D., and S. M. Kimball. 2005. "Teacher Quality and Educational Equality: Do Teachers with Higher Standards-based Evaluation Ratings Close Student Achievement Gaps?" *The Elementary School Journal* 106 (1): 3–20. doi:10.1086/496904.
- Bowers, A. J., R. Sprott, and S. Taff. 2013. "Do We Know Who Will Dropout? A Review of the Predictors of Dropping Out of High School: Precision, Sensitivity and Specificity." *The High School Journal* 96 (2): 77–100. doi:10.7916/D86W9N4X.
- Chudgar, A., and T. F. Luschei. 2016. "Understanding Teacher Distribution Cross-Nationally: Recent Empirical Evidence." *Teachers College Record*. Accessed 24 November 2020. <http://www.tcrecord.org>
- Cliffordson, C. 2004. "Betygsinflation I De Mårelaterade Gymnasiebetygen" [Grading Inflation in the Goal-Related Upper Secondary School Grades]. *Pedagogisk Forskning i Sverige* 9 (1): 1–14.
- Cliffordson, C. 2008. "Differential Prediction of Study Success across Academic Programs in the Swedish Context: The Validity of Grades and Tests as Selection Instruments for Higher Education." *Educational Assessment* 13 (1): 56–75. doi:10.1080/10627190801968240.
- Eurydice. 2018. "Teaching Careers in Europe: Access, Progression and Support." Luxembourg: Publications Office of the European Union.
- Grönqvist, E., and J. Vlachos. 2008. "One Size Fits All? the Effects of Teacher Cognitive and Non-Cognitive Abilities on Student Achievement." IFAU Working paper 25. Accessed 24 November 2020. <https://www.ifau.se/globalassets/pdf/se/2008/wp08-25.pdf>

- Guarino, C. M., L. Santibanez, and G. A. Daley. 2006. "Teacher Recruitment and Retention: A Review of the Recent Empirical Literature." *Review of Educational Research* 76 (2): 173–208. doi:10.3102/00346543076002173.
- Guerriero, S., ed. 2017. *Pedagogical Knowledge and the Changing Nature of the Teaching Profession. Educational Research and Innovation*. Paris: OECD Publishing. doi:10.1787/20769679.
- Gustafsson, J.-E., and K. Y. Hansen. 2009. "Resultatförändringar I Svensk Grundskola" [Changes in Results in Swedish Compulsory Schools]. In *Vad Påverkar Resultaten I Svensk Grundskola? Kunskapsöversikt Om Betydelsen Av Olika Faktorer [What Affects the Results in Swedish Compulsory School? Overview of the Effects of Different Factors]*, edited by Skolverket, 40–83. Stockholm: Skolverket.
- Hansen, Kajsa, Y., and J.-E. Gustafsson. 2016. "Causes of Educational Segregation in Sweden: School Choice or Residential Segregation." *Educational Research and Evaluation* 22 (1–2): 23–44. doi:10.1080/13803611.2016.1178589.
- Hansson, Å., and J.-E. Gustafsson. 2016. "Pedagogisk Segregation: Lärarkompetens I Den Svenska Grundskolan Ur Ett Likvärdighetsperspektiv" [Pedagogical Segregation: Teacher Competence in the Swedish Compulsory School from a Perspective of Equivalence]. *Pedagogisk Forskning I Sverige* 21 (1–2): 56–78.
- Hanushek, E. A., M. Piopiunik, and S. Wiederhold. 2018. "The Value of Smarter Teachers: International Evidence on Teacher Cognitive Skills and Student Performance." *Journal of Human Resources*. doi:10.3368/jhr.55.1.0317.8619R1.
- Hargreaves, A., and M. Fullan. 2012. *Professional Capital: Transforming Teaching*. New York, NY: Teachers College Press.
- Hargreaves, L. 2007. "The Status of Teachers and the Teaching Profession in England: Views from inside and outside the Profession. Final Report of the Teacher Status Project". University of Cambridge Faculty of Education.
- Hargreaves, L. 2009. "The Status and Prestige of Teachers and Teaching." In *International Handbook of Research on Teachers and Teaching*, edited by L. J. Saha and A. G. Dworkin, 217–229. Vol. 21 Part 1. New York, NY: Springer. doi:10.1007/978-0-387-73317-3_13.
- Harris, D. N., and T. R. Sass. 2009. "What Makes for a Good Teacher and Who Can Tell?" Working Paper 30. National Center for Analysis of Longitudinal Data in Education Research. Accessed 23 November 2020. <http://www.caldercenter.org>
- Harris, D. N., and T. R. Sass. 2011. "Teacher Training, Teacher Quality and Student Achievement." *Journal of Public Economics* 95 (7–8): 798–812. <https://www.iva.se/globalassets/info-trycksaker/iva/201609-iva-henrekson-javervall-i.pdf>
- Holmlund, H., J. Häggblom, E. Lindahl, S. Martinson, A. Sjögren, U. Vikman, and Ö. Björn. 2014. *Decentralisering, Skolval Och Fristående Skolor: Resultat Och Likvärdighet I Svensk Skola [Decentralization, School Choices and Independent Schools: Results and Equivalence in Swedish Schools]* Rapport 2014. Uppsala: IFAU Institutet För Arbetsmarknads- och Utbildningspolitisk Utvärdering. 25
- Kleickmann, T., D. Richter, M. Kunter, J. Elsner, M. Besser, S. Krauss, and J. Baumert. 2013. "Teachers' Content Knowledge and Pedagogical Content Knowledge: The Role of Structural Differences in Teacher Education." *Journal of Teacher Education* 64 (1): 90–106. doi:10.1177/0022487112460398.
- Kukla-Acevedo, S. 2009. "Do Teacher Characteristics Matter? New Results on the Effects of Teacher Preparation on Student Achievement." *Economic of Education Review* 28 (1): 49–57. doi:10.1016/j.econedurev.2007.10.007.
- Kunter, M., U. Klusmann, J. Baumert, D. Richter, T. Voss, and A. Hachfeld. 2013. "Professional Competence of Teachers: Effects on Instructional Quality and Student Development". *Journal of Educational Psychology* 105 (3): 805–820. doi:10.1037/a0032583.
- Lindblad, S., L. Lundahl, J. Lindgren, and G. Zackari. 2002. "Educating for the New Sweden?" *Scandinavian Journal of Educational Research* 46 (3): 283–303. doi:10.1080/0031383022000005689.
- Lotz, C., R. Schneider, and J. R. Sparfeldt. 2018. "Differential Relevance of Intelligence and Motivation for Grades and Competence Tests in Mathematics." *Learning and Individual Differences* 65: 30–40. doi:10.1016/j.lindif.2018.03.005.

- Lynch, S., J. Worth, S. Bamford, and K. Wespieser. 2016. *Engaging Teachers: NFER Analysis of Teacher Retention*. Slough: NFER.
- Meroni, E. C., E. Vera-Toscano, and P. Costa. 2015. "Can Low Skill Teachers Make Good Students? Empirical Evidence from PIAAC and PISA." *Journal of Policy Modeling* 37 (2): 308–323. doi:10.1016/j.jpomod.2015.02.006.
- Moats, L. C. 2009. "Knowledge Foundations for Teaching Reading and Spelling." *Reading and Writing: An Interdisciplinary Journal* 22 (4): 379–399. doi:10.1007/s11145-009-9162-1.
- Mullis, I. V. S., M. O. Martin, and T. Loveless. 2016. "20 Years of TIMSS: International Trends in Mathematics and Science Achievement, Curriculum, and Instruction". Chestnut Hill, MA: TIMSS and PIRLS International Study Center, Lynch School of Education, Boston College and International Association for the Evaluation of Educational Achievement (IEA). Accessed 23 November 2020. <http://timss2015.org/timss2015/wp-content/uploads/2016/T15-20-years-of-TIMSS.pdf>Downloaded2020/11/23
- Myrberg, M., and A.-L. Lange. 2006. "Identifying, Diagnostik Samt Specialpedagogiska Insatser För Elever Med Läs- Och Skrivsvårigheter." [*Identifying, Diagnostician and Special Educational Efforts for Students with Reading and Writing Difficulties*]. Stockholm: Specialpedagogiska Institutet.
- OECD. (2005). "Attracting, Developing and Retaining Effective Teachers - Final Report: Teachers Matter". Accessed 24 November 2020. <http://www.oecd.org/education/school/attractingdevelopingandretainingeffectiveteachers-finalreportteachersmatter.htm>Downloaded2020/11/24
- OECD. 2018. *Effective Teacher Policies: Insights from PISA*. Paris: PISA, OECD Publishing. doi:10.1787/9789264301603-en.
- Price, H. E., and K. Weatherby. 2018. "The Global Teaching Profession: How Treating Teachers as Knowledge Workers Improves the Esteem of the Teaching Profession." *School Effectiveness and School Improvement* 29 (1): 113–149. doi:10.1080/09243453.2017.1394882.
- Proposition2010/11:20. *Legitimation För Lärare Och Förskollärare*. [Certification for Teachers and Preschool Teachers]. Stockholm: Author.
- Rice, J. K. 2008. *From Highly Qualified to High Quality: An Imperative for Policy and Research to Recast the Teacher Mold*. Presidential Essay. American Education Finance Association.
- Sawyer, R. 2013. "Beyond Correlations: Usefulness of High School GPA and Test Scores in Making College Admissions Decisions." *Applied Measurement in Education* 26 (2): 89–112. doi:10.1080/08957347.2013.765433.
- Shulman, L. S. 1998. "Theory, Practice, and the Education of Professionals." *The Elementary School Journal* 98 (5): 511–526. doi:10.1086/461912.
- SOU. 2014. "Staten Får Inte Abdikera: Om Kommunaliseringen Av Den Svenska Skolan". [The State Must not Abdicate – About the Communalization of Swedish School]. In *Statens Offentliga Utredningar 2014:05*. [Official Reports of the Swedish Government 2014:05]. Stockholm: Utbildningsdepartementet.
- Statistics Sweden. 2019. Accessed 2019 June 26. <https://www.scb.se/hitta-statistik/sverige-i-siffror/utbildning-jobb-och-pengar/utbildningsnivan-i-sverige/>Downloaded2019/06/26
- Stenlås, N. 2009. "En Kår I Kläm: Lärarket Mellan Professionella Ideal Och Statliga Reformideologier". [A profession caught in the middle: teachers between professional ideals and state reform ideologies] ESO-rapport 2009:6. Stockholm: Regeringskansliet, Finansdepartementet.
- Svensson, A. 1971. "Relative Achievement. School Performance in Relation to Intelligence, Sex and Home Environment." In *Göteborg Studies in Educational Science*. Vol. 6. Göteborg: Acta Universitatis Gothoburgensis.
- Svensson, A., and B. Nielsen. 2008. "Percentilekvivalerade Betyg: En Beskrivning Av Hur Grundskole- Och Gymnasiebetyg Har Transformerats till Percentilvärden". [Percentile Equivalent Scores: A Description of How Primary and Secondary School Grades have been Transformed into Percentile Values]. Teknisk rapport 1. Göteborg: Göteborgs universitet.
- Svensson, L. G. 2003. "Yrkes- Och Professions sociologi". [Occupational and Professional Sociology]. In "Reflektioner. Perspektiv I Forskning Om Arbetsliv Och Arbetsmarknad." edited by M. Blomsterberg

and T. Soidre, 27–68. Forskningsrapport nr 126. Sociologiska institutionen. Göteborg: Göteborgs universitet.

Swedish Higher Education Authority. 2017. "Lärarstudenternas Gymnasiebetyg, Avhopp Och Studieprestation. Statistisk Analys." [Student teachers' Upper Secondary School Grades, Dropouts and Study Performance. Statistical Analysis] Stockholm: Universitetskanslersämbetet. [The Swedish Higher Education Authority].

Teresa, O., and H. Judith. 2018. "Teacher Recruitment: Reflections from Ireland on the Current Crisis in Teacher Supply." *European Journal of Teacher Education* 41 (5): 654–669. doi:[10.1080/02619768.2018.1532994](https://doi.org/10.1080/02619768.2018.1532994).

Wayne, A. J., and P. Youngs. 2003. "Teacher Characteristics and Student Achievement Gains." *Review of Educational Research* 73 (1): 89–122. doi:[10.3102/00346543073001089](https://doi.org/10.3102/00346543073001089).

Wermke, W., and E. Forsberg. 2017. "The Changing Nature of Autonomy: Transformations of the Late Swedish Teaching Profession." *Scandinavian Journal of Educational Research* 61 (2): 155–168. doi:[10.1080/00313831.2015.1119727](https://doi.org/10.1080/00313831.2015.1119727).

Zumwalt, K., and E. Craig. 2005. "Teachers' Characteristics: Research on the Indicators of Quality." In *Studying Teacher Education: The Report of the AERA Panel on Research and Teacher Education*, edited by M. Cochran-Smith and K. M. Zeichner, 157–269. Mahwah, NJ: Lawrence Erlbaum.