

Teachers: their characteristics and their role in the education system *

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Abstract: Teachers are central to the quality and equity of an education system. However, they have been largely overlooked by the modern sociology of education. To raise awareness of teachers and their importance to sociological inquires, this chapter reviews the literature with the aim of answering three questions. First, how important are teachers to student learning? Second, what observable teacher characteristics foster student learning gains? Third, who self-selects into the teaching profession – and what are the consequences of this for the supply of high-quality teachers?

Keywords: teacher quality; teacher effect; value-added modelling; teacher characteristics; education system

1. Introduction

Teachers have responsibility for the key tasks schools perform in society (Parsons 1959), namely transmitting knowledge, skills and values to students. In addition, by giving grades, certificates and track recommendations, teachers also perform the other key function of schools, namely that of evaluation and selection, by means of which access to the next levels of education and occupational positions are regulated (Parsons 1959; Sorokin 1959 [1927], p. 188). It is hardly surprising, therefore, that teachers are regarded as being particularly important to the quality and equity of an education system (e.g. Rivkin et al. 2005; OECD 2005; Hattie 2009). Teachers are not only the key agents in the education system, but are also the major cost factor. At primary and secondary levels, Organisation for Economic Co-operation and Development (OECD) countries spend on average between 61 per cent and 63 per cent of their total current expenditure on teachers' pay (OECD 2017, p. 226).

Sociologists have long recognized the crucial role of teachers in education, and have focused their attention on several aspects of teachers' work. Early examples include ethnographical or theoretical work on teachers' social roles and networks, their working conditions, the organization of teaching, and structural factors that shape student–teacher interactions (Lortie 1975; Waller 1932; Polansky 1954; Dreeben 1970; Wilson 1962). Early quantitative work has complemented this body of literature, a prominent example being the first Coleman Report (Coleman et al. 1966), one of the largest and arguably most influential empirical studies in the sociology of education. One of Coleman's major findings was that sources of inequality of educational opportunity are largely rooted in families, not in schools. Within schools, however, teachers are the most important factor. 'Given the fact that no school factors account for much variation in achievement, teachers' characteristics account for more than any other', Coleman et al. wrote (1966, p. 325). Despite these early accounts, modern sociology pays only scant attention to the role of teachers, it seems. A literature review

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searching for the keyword ‘teacher’ in titles, abstracts or keywords of all articles published between 1985 and 2018 in the *American Journal of Sociology*, *American Sociological Review* and *European Sociological Review* returned just 22 hits out of 3480 articles. While the selection of journals, time span and keywords is debatable (the ASA journal *Sociology of Education*, for example, returns more hits), the general impression holds. In their influential study ‘Bringing the teacher back in’, Alexander and colleagues reached a similar conclusion, noting that ‘In recent years the dominant theories and research agendas of educational sociologists have focused on everything but the teacher’ (Alexander et al. 1987, p. 666).

Against this background, the aim of this chapter is to raise awareness of the role of teachers in sociological inquiries. To this end, the chapter mainly draws on some illuminating findings from other disciplines. In section 2, the chapter considers the extent of teachers’ effects on students’ learning gains, as measured by value-added models (VAMs). VAMs estimate the overall capacity teachers have to influence student learning, but they do not measure the influence of specific, observable teacher competence attributes. Such observable competence attributes are considered in section 3. In section 4, a simple theoretical model is introduced showing that the development of teacher competence depends not only on the quality of teacher training, but also on the recruitment of suitable trainees. To explore the issue of who self-selects into the profession, section 5 describes (future) teacher characteristics, emphasizing some international trends and patterns. The conclusion summarizes the chapter’s major findings and highlights the importance of teachers in tackling inequality of educational opportunity.

2. How large are teacher effects?

Student learning is influenced by a wide range of factors. School effectiveness research, pioneered by Coleman’s report (Coleman et al. 1966), has shown repeatedly that the largest variation in student achievement is caused by factors outside of schools: most importantly, individual capabilities and family resources (e.g. Rowan et al. 2002; Scheerens and Bosker, 1997). It is difficult for the education system to influence these factors. Out of all the factors within schools, it is widely held that the quality of teachers is the most crucial (e.g. Darling-Hammond 2000; Schleicher 2011). But how important are teachers for student learning? And, hence, what is the scope for interventions that focus on teachers? Empirical research has approached this question from two angles. On the one hand, studies estimate the ‘value-added’ of teachers to students’ learning gains, irrespective of observable teacher characteristics, to identify the size of teacher effects (this section). On the other hand, research has investigated teacher characteristics that are associated with students’ learning gains (section 3). With few exceptions (see Jennings and DiPrete 2010; Blazar 2018), both approaches have focused on one segment of students’ learning in school: their performance in standardized tests. Obviously, student learning includes other aspects not captured by these tests, such as social, emotional and behavioural skills. Nevertheless, I focus here on test score gains, for which empirical evidence is available.

Estimating teacher VAMs has become a widespread analytical strategy among US educational economists (for an overview see Hanushek and Rivkin 2010b; Koedel et al. 2015). These researchers typically make use of large administrative datasets that include yearly measures of student test scores, along with yearly information on several student background,

teacher and classroom variables available in these datasets. With this data, VAMs predict a student's test score in a given year based on his or her previous performance and a range of control variables. The predicted score is then compared to the actual score of the student. By aggregating these differences for all students who are taught by a given teacher, VAMs estimate how much a teacher contributes to the learning progress of his or her students in comparison to an average teacher. VAMs differ in terms of model specifications, test score measures and choice of control variables (for an overview see Koedel et al. 2015). In recent years, models have become more complex and the datasets have become larger. For example, the data in Chetty et al. (2014a) covers more than 2.5 million students and includes over 18 million achievement tests spanning the period 1989–2009. Table 1 provides an overview of studies, estimated using different samples of students and teachers in different school districts in the United States. Teacher effects are expressed in units of student achievement (see Hanushek and Rivkin 2010b). They show the additional learning gain that a student would achieve when being taught by a teacher who is one standard deviation more effective than the average teacher. For example, the reading results imply that having a teacher at the twenty-fifth percentile as compared to the seventy-fifth percentile of the teacher quality distribution would produce an additional learning gain of roughly 0.14 standard deviations (averaged over all studies) in a school year, *ceteris paribus*. In maths, teacher effects are slightly larger. The size of these effects corresponds roughly with the difference in reading literacy scores between boys and girls at the end of grade 4 in Germany, that is, 7–13 points on the reading literacy scale developed in the Progress in International Reading Literacy Study (PIRLS). This may seem relatively small at first sight, but effects accumulate over a school career. Thus, if students happen to be exposed to effective or ineffective teachers over several years, the impact can be huge.

Table 1. Teacher value-added: estimated standard deviation of teacher effectiveness measured in terms of standard deviations of student achievement

Study	Teacher effectiveness	
	Reading	Mathematics
Rockoff (2004)	0.10	0.11
Nye et al. (2004)	0.26	0.36
Rivkin et al. (2005)	0.10	0.11
Aaronson et al. (2007)	–	0.13
Kane et al. (2008)	0.08	0.11
Jacob and Lefgren (2008)	0.12	0.26
Kane and Staiger (2008)	0.18	0.22
Koedel and Betts (2007)	–	0.23
Rothstein (2010)	0.11	0.15
Hanushek and Rivkin (2010a)	–	0.11
Papay (2011)	0.05–0.21	–
Corcoran et al. (2011)	0.13–0.26	0.15–0.25
Chetty et al. (2014a)	0.10	0.14

Source: Table from Hanushek and Rivkin (2010b) extended by newer studies. All available studies are based on US data.

Unfortunately, as far as I am aware, teacher VAMs are largely missing for other countries. One notable exception from Germany is the COACTIV study, an extension to the Programme for

International Student Assessment (PISA) 2003, which re-tested the maths performance of 15-year-old students after one year, and included a range of teacher, classroom and student variables (Baumert et al. 2010). With a slightly different estimation strategy compared with the US VAMs, Baumert et al. (2010) predict maths test scores at the end of grade 10 in a multilevel model. Controlling for central student level variables (test score in grade 9, intelligence, social origin, migration background), the authors explain 64 per cent of the variance in maths test scores, while 4.6 per cent of the residual variance remains unexplained at the classroom level. If we assume that this residual variance at the classroom level largely reflects teacher quality, then the square root of $\Delta R^2=0.046$ (i.e. $\Delta R=0.21$) can be loosely interpreted as a standardized regression coefficient of student achievement on teacher effectiveness (see Nye et al. 2004). The size of this estimate is comparable to that reached in the US literature (see Table 1), suggesting that findings could be similar in other countries. It should be noted that VAMs compare teachers relative to one another, but not in absolute terms. If, for instance, top-performing teachers were to leave a dataset (i.e. a school district), average learning gains would be reduced, and the individual value-added scores of remaining teachers would increase.

The use of value-added scores as measures of teacher effectiveness is controversial (see Rothstein 2010; Corcoran et al. 2011; Papay 2011; and the reply by Chetty et al. 2014a; and Koedel et al. 2015, among others). A key concern is the instability of value-added scores across time and across the type of student test used to estimate them. This suggests that teachers vary in their effectiveness, and that their effectiveness depends on the students they teach. Furthermore, especially in school districts where teacher salaries are based on value-added scores, teachers may be motivated to ‘teach to the test’, and exclude from their curriculum other important areas and topics. Another concern is that value-added scores may be biased due to student sorting or other sources of unobserved heterogeneity, and teachers may be held accountable for factors outside of their control (Rothstein 2017).

Despite these concerns, many researchers agree that VAMs are useful in identifying variation in teacher performance with respect to student test score achievement. The value-added literature has produced a series of interesting findings. Most notably, Chetty et al. (2014b) find that students assigned to effective teachers are more likely to attend college and earn higher salaries, and are less likely to have children as teenagers. A study by Jennings and DiPrete (2010) contributes to the literature by estimating teacher effects on social and behavioural skill development, such as a positive attitude to learning, or the ability to observe school rules and avoid disruptive behaviour. The authors find sizeable teacher effects on such outcomes, sometimes larger than teacher effects on academic development. Interestingly, the teachers who are good at promoting social and behavioural skills may not be the same teachers who are effective for academic development. According to the authors, this challenges the dominant notion of ‘good’ versus ‘bad’ teachers. Rather, ‘the question we should be asking is “good at what?”’ (Jennings and DiPrete 2010, p. 156).

Taken together, value-added studies have greatly improved our knowledge of teacher effects on student academic achievement. They describe the scope that teachers have to influence student learning, but without estimating the influence of specific, observable characteristics. I consider these in the next section.

3. Which observable teacher characteristics improve student learning gains?

While there is a broad consensus on the importance of teachers, attempts to identify observable characteristics of teachers which are related to student learning gains have been mainly disappointing.¹ This disappointment stems largely from the fact that a wide range of studies to date rely on proxy indicators for ‘teacher quality’, the selection of which was governed by availability in administrative datasets, not by theory. These proxy indicators include teaching experience, advanced college degrees (such as a master’s), college quality and teaching certificates (for reviews see Goe 2007; Wayne and Youngs 2003; and Coenen et al. 2018). The results can be summarized as follows: experience, as a proxy for professional knowledge acquired on the job, tends to contribute to student test scores throughout a teacher’s career. The other variables sometimes indicate positive, and sometimes non-significant effects; and the possession of a master’s degree sometimes even indicates negative effects. In general, effect sizes are small and vary across school level and examined subject. Studies typically focus on mathematics, and sometimes on reading; evidence for other subjects is sparse. Overall, the proxy indicator approach has not been very successful. Accordingly, Rockoff et al. (2011, p. 44) summarize: ‘Like the well-known story of a man looking for his keys under a street light – not because he dropped them nearby, but because that is where he can see – researchers’ lack of success in predicting new teacher performance may be driven by a narrow focus on commonly available data.’

A more promising approach has been a theory-based development of teacher competence models and a subsequent measurement of the model predictions (e.g. Shulman 1987; Kunter et al. 2013a). If teachers are to provide lessons which offer cognitively stimulating learning situations with certain regularity, and to provide students with carefully targeted support within a stable structural framework to enhance learning, then, according to the model, they need to possess a series of personal abilities which enable them to meet these teaching demands. These ‘aspects of teachers’ professional competence’ include, first and foremost, professional knowledge, which can be subdivided into content knowledge, pedagogical content knowledge and general pedagogical knowledge. Furthermore, motivational orientations (above all, intrinsic motivation and enthusiasm), a well-developed capacity for self-regulation, and certain beliefs, values and goals are paramount (Kunter et al. 2013a).

3.1 Professional knowledge

Professional knowledge lies at the heart of teacher competence models. Several studies provide evidence for the importance of professional knowledge. Based on a longitudinal study conducted in Germany with a representative sample of tenth-graders and their mathematics teachers, Baumert et al. (2010) and Kunter et al. (2013b) found that teachers’ pedagogical content knowledge in maths exerted a substantial positive effect on students’ learning gains that was mediated by the provision of cognitive activation and individual learning support. Similarly, Hill et al. (2005) showed that learning gains for US elementary school students were larger when their teachers scored higher on mathematical knowledge and skills used in teaching mathematics. Using the same knowledge test for teachers, Rockoff et al. (2011) largely confirmed this finding for elementary and middle school teachers in New York City. However,

effect sizes for student achievement gains were relatively weak, with an estimated effect size of about 0.03 standard deviations. For a sample of Peruvian sixth-graders and their teachers, Metzler and Woessmann (2012) found that a one standard deviation increase in subject-specific teacher achievement increased student achievement by about 0.09 standard deviations. Other studies which have reported positive associations between teachers' professional knowledge and students' learning gains in mathematics or science are Sadler et al. (2013) and Campbell et al. (2014). For reading, effect sizes are typically smaller and mostly insignificant (Metzler and Woessmann 2012). An exception is Kelcey (2011), who reported that teachers' reading knowledge was significantly associated with students' achievement in reading comprehension, but not word analysis. Kelcey's sample was drawn from school districts with high levels of poverty and underachievement in Michigan, and thus cannot be generalized to other school districts. Effects in reading may be weaker because reading is also learned outside of schools, while mathematics and science are primarily learned in school, and therefore are more directly affected by teachers (Nye et al. 2004, p. 247). In summary, the literature provides promising evidence that direct measures of teachers' professional knowledge can be linked with students' achievement gains, suggesting that knowledge does matter.

3.2 More than knowledge

The teacher competence model proposes that teaching requires not only profound knowledge, but also certain motivational orientations, self-regulation skills, and beliefs (Kunter et al. 2013a). Teaching requires high levels of attention, energy and tolerance for frustration. However, only few studies have been able to empirically test the correlation between such measures and students' test score gains. For Germany, Kunter et al.'s (2013b) findings suggest positive effects of enthusiasm for teaching, and self-regulatory skills, on instructional quality, which in turn affect students' achievement gains in maths. These findings fit with the results of correlative and experimental studies, according to which students taught by enthusiastic or intrinsically motivated teachers showed more motivation and interest themselves (Babad 2007; Frenzel et al. 2009; Kunter et al. 2011; Kunter et al. 2008; Roth et al. 2007; Wild et al. 1992). In sum, the concept of a multidimensional teacher competence portfolio seems very promising. However, further longitudinal studies are required to confirm the impact of non-cognitive aspects of teacher competence on students' learning gains.

4. The importance of pre-training characteristics in the genesis of professional teacher competence

Having clarified some ways in which teacher competence can improve student learning outcomes, I now consider how teachers acquire such competences. This question is central to discussions about teacher quality. While some scholars propose that recruiting the brightest individuals into teaching is crucial, because teaching itself can be learned on the job, others have emphasized that teaching requires specialized knowledge that can only be acquired in high-quality teacher preparation environments (Kunter et al. 2013b). A third approach combines these two ideas to some extent. This approach – which to my mind is the most plausible model explaining the genesis of teacher competence – is rooted in general models of learning. Forty

years ago, sociologists Sørensen and Hallinan (1977) presented such a general model, with school students as learners. They argued, first, that learning only takes place if there are opportunities for learning. Second, the amount of learning acquired in a given learning opportunity period, such as a course, depends on two sets of individual variables – those determining ability to learn, and those determining effort. In their model, opportunities for learning are interactive effects that determine the effect of ability and effort on learning. In other words, if opportunities for learning are non-existent, no learning can take place. Likewise, if individual ability or effort are very limited, the best learning environments will be unable to enhance learning. More recently, a similar idea has been proposed for teacher learning (Roloff-Henoch et al. 2015; Kunter et al. 2013b). This theory suggests that individual characteristics, such as cognitive ability, motivation and personality, will influence the amount of competence that a teacher candidate acquires during teacher training. Good teaching, then, is a function not only of good teacher training, but also of individual characteristics of teachers. Empirical evidence supports the notion that cognitive and motivational pre-training characteristics influence the degree of acquired competence of (prospective) teachers (Blömeke et al. 2012; Kleickmann et al. 2013). Against this background, it is essential to investigate who enters teaching. The following section reviews what we know about the (pre-training) characteristics of teachers.

5. Characteristics of (future) teachers

Pursuing the notion that the amount of professional competence acquired during teacher training depends not only on the quality of training, but also on the characteristics of those entering training, this section discusses the characteristics of student teacher candidates or teachers. Theoretically, the decision to enter teaching can be conceived as a rational choice (e.g. Neugebauer 2013; Reimer and Dorf 2014). Individuals choose teaching if the imagined returns to working as a teacher outweigh the possible returns of alternative careers, net of the costs of each alternative. These benefit–cost considerations are influenced not only by monetary considerations (i.e. earning opportunities), but also by an individual’s abilities and interests (this model is also in line with person–environment fit approaches (Holland 1997)). If a person is interested in a certain job profile, and at the same time feels able to perform well in the job, the expected utility of choosing this job over an alternative job increases.

Previous reviews of the teacher recruitment literature show that there are plenty of studies for the United States (Brookhart and Freeman 1992; Guarino et al. 2006; Zumwalt and Craig 2011), but not for other countries. In addition, the authors point out that these studies are typically based on non-representative samples, and are limited to single institutions. In addition, most studies do not compare those who choose teaching with those who do not, in order to ascertain the distinguishing characteristics or motivations of teachers. Given these limitations, the following review synthesizes studies concerned with teacher candidates, as well as studies describing characteristics of those already working as teachers, to map out what is known about the process of selection into the teaching profession. Obviously, there are ample differences between countries. In what follows, I attempt to review internationally comparative studies, supplemented by selected internationally published country studies, to identify some general themes. The review is organized into three major categories: (a) sociodemographic

characteristics, (b) performance-related characteristics and (c) interests and motivations. Note that sociodemographic characteristics are (probably) not relevant for a future teacher's competence acquisition per se. However, sociodemographic characteristics have been frequently investigated in relation to more general models of career choice. In addition, they may contribute to the explanation of differences in performance among a diverse student population. Below, I summarize the most important debates concerning these characteristics.

5.1 Sociodemographic teacher characteristics

Gender. Women are more likely than men to enter teaching. Across OECD countries and educational levels, more than two-thirds of teachers are women (OECD 2017). The proportion of females in the teaching profession varies by educational level. While women constitute more than 80 per cent of all teachers in primary education, this average drops to 69 per cent in lower secondary education, and to 43 per cent in tertiary education. While the majority of teachers are female, only 45 per cent of school principals are women, suggesting that promotion to a leadership position in school is dependent on gender. The higher share of women below the age of 30 suggests that the feminization of teaching will intensify in future years, as more men will retire in the near future. The proportion of females in teaching varies strikingly across countries (see UNESCO 2016). The highest proportions of female teachers (in primary education) are found in the Russian Federation (99 per cent) and other Central (70–90 per cent) and Eastern European countries (90 per cent or more), as well as the United States (87 per cent), while the lowest shares are in countries of Sub-Saharan Africa, for example Liberia (13 per cent), Togo (16 per cent) and the Democratic Republic of the Congo (28 per cent). The most plausible explanation for this pattern, as put forward in Neugebauer et al. (2011), is that female access to higher education, which is a prerequisite for gaining teacher licensure in most countries, varies between countries. Female participation in education and the labour market has been traditionally high in the United States and former communist countries, but low and restricted in many developing countries. Hence, the low share of female teachers in a given country is often a consequence of their restricted access to higher education. In recent years, concerns have been voiced regarding the high proportion of women teachers. It has been conjectured that this disproportion can account, in part, for the growing educational disadvantage of males (e.g. Dee 2007). While findings are mixed for the United States, the majority of studies from a wide range of other countries found no effect of teacher gender on the performance of boys or girls (for a review see Coenen et al. 2018).

Age. The average age of teachers in secondary education is 44–45 years across OECD countries (OECD 2017). Age patterns differ substantially across countries. In the European Union (EU), Italy has the oldest teacher workforce, and less than 10 per cent of teachers are aged below 40 (Eurydice 2015). By contrast, in the United Kingdom, more than 50 per cent are younger than 40. Teachers' age is of concern because it affects the demand for future teachers. Several countries, such as Italy, will face challenges as substantial proportions of the teacher workforce reach retirement age in the next decade (OECD 2014; OECD 2005). As in the case of some EU countries, several developing and middle-income countries have older teaching workforces, such as Kenya and Chile (UNESCO 2006). Variation in teacher age distribution is often caused by cyclical waves of teacher shortages and surpluses, apparent in many countries (Neugebauer

2015). Shortages often occur over a few years due to population growth (e.g. migration), educational expansion or educational reforms (e.g. an increase in the length of compulsory schooling) requiring additional teachers. This leads to a higher demand for teachers at a given time, and positions are typically filled by those entering the teacher labour market around this time. This age group then dominates the teaching workforce until retirement, and determines the hiring opportunities of following teacher generations. The teacher labour market situation also has an effect on who decides to enter teaching. In times of favourable hiring opportunities, more people with extrinsic job security motives are attracted to the profession (Neugebauer 2015). Another central theme around the topic of age is the fact that the age distribution of the teacher workforce correlates with teaching experience. While there is some discussion about how much experience matters for student learning, there is wide recognition that the experience of teachers is an important quality factor in schools (Coenen et al. 2018). Lastly, teachers' age distribution is a cost factor, as many school systems base their salary schedules on a teacher's level of experience (Ingersoll et al. 2017).

Race/ethnicity. Information on race or ethnic minorities in the teaching workforce is readily available for the United States, but limited for most other countries. In the United States, minorities are underrepresented in teaching when compared to the student population; however, the teacher workforce is becoming more racially and ethnically diverse over time (Guarino et al. 2006). In the past 15 years, the percentage of teachers belonging to a minority group, such as Asian, Hispanic or African-American, increased from 12.4 per cent to 17.3 per cent between 1987/88 and 2011/12 (Ingersoll et al. 2017). For most other countries, data on ethnic or racial origin is not typically collected in official statistics. One of the few data sources that provides some information on minority status is the Teacher Education and Development Study-Mathematics (TEDS-M), a large-scale comparative study which sampled student teachers in 17 countries who were prepared to teach mathematics in primary or lower secondary education (Tatto et al. 2012; Blömeke et al. 2014). As an indicator for migration background, TEDS-M asked future teachers about their language spoken at home. In several countries, substantial proportions of future teachers regularly communicated in a different language at home from that used in school. However, these were countries like Botswana or the Philippines where the majority of the population speak in local idioms rather than English, the official language; language spoken at home hardly indicates minority status in these countries. In all other countries, sizeable proportions of future teachers said that they always spoke the language of the school at home (e.g. 93 per cent in Germany, 96 per cent in Poland, 95 per cent in the United States). These shares are typically higher compared to other college students, indicating that minorities are probably underrepresented in teacher training in many countries. A recent review of the sparse European data landscape indicates that people with a migrant and/or minority background are underrepresented among teachers or student teachers in nearly all countries, when compared with the students they teach (Donlevy et al. 2016). Overall, these findings suggest that (self-)selection into teaching is less likely for those coming from an ethnic or racial minority group. Whether the mismatch between the minority status of teachers and students is detrimental to the educational success of ethnic minority students is a contentious issue. Policymakers often call for more diversity in the teacher workforce, assuming that minority students might benefit from being taught by a minority teacher (e.g. Donlevy et al. 2016; US

Department of Education 2016). In the United States, a number of studies examined the benefits of having a matching teacher in that sense, most of them focusing on racial matches. As Driessen (2015) noted in his review of the literature, these studies came to inconclusive results, and if there were any (positive) effects, they were mostly small in magnitude. Positive effects of same-race matches tended to be stronger for subjective effect measures (mostly teacher evaluations of student behaviour), as opposed to students' test scores, but the overall evidence is too weak to draw any strong conclusions. In other countries, as far as I am aware, only two quantitative studies have investigated this issue, both with data from Germany (Klein et al. 2019; Neugebauer and Klein 2016). They found virtually no evidence that migrant students benefit from being taught by a migrant teacher.

Social origin. Despite a wealth of information on the social origins of students, information on the socioeconomic backgrounds of teachers is very limited. The above-mentioned TEDS-M study (Tatto et al. 2012) provides data on the educational level of future teachers' parents, but no information on the educational level of a comparison group in the countries surveyed. This highlights a general difficulty in the description of teacher populations: comparison groups of people who are not (future) teachers are often not included in studies on teachers. In consequence, it is hardly possible to identify characteristics which are 'characteristic' of teachers. It is sometimes conjectured that teaching is an occupation which attracts students from lower social origins (Neugebauer 2013; Lortie 1975), the argument being that, through their experience as students, they are aware of the demands and characteristics of teaching, whereas very few other academic occupations can be so familiar to students from non-academic families. The lower confidence among students from non-academic backgrounds in their own potential to excel in higher education and in an academic occupation could be counteracted through their experience, as students, of the teaching profession. The evidence for this is not very strong yet, but the majority of available studies support this conjecture, suggesting that individuals from lower social origins are overrepresented among teachers in several countries. Based on a review of a few locally restricted studies from the United States, Brookhart and Freeman (1992) concluded that student teacher candidates typically come from homes with a lower socioeconomic status than those of college students in general (see also Zumwalt and Craig, 2011). On the other hand, Alexander et al. (1987) reported large standard deviations for their measure of teachers' socioeconomic origins, suggesting that teachers were coming from a wide range of family backgrounds in their sample of elementary teachers from Baltimore (USA). Regarding Germany, Roloff-Henoch et al. (2015) reported similar socioeconomic backgrounds for future teachers and other college students, while Neugebauer (2013) found that parental education is lower among student teachers than among their peers in other fields of study at university. This is especially true for future teachers at the primary or lower secondary level, as opposed to upper secondary school. Westphal et al. (2016) reported that German teachers had, on average, slightly higher socioeconomic backgrounds (HISEI=55) than their students (HISEI=50). For Switzerland, Denzler and Wolter (2009) found that high school graduates choosing teacher training are typically from non-academic backgrounds. Despite the notion that lower socioeconomic origins probably correlate positively with (self-)selection into the teaching profession, and that teaching may be an occupation suited to intergenerational social upward mobility, concerns have been voiced that schools and their teachers represent a

middle-class culture, and that their match or mismatch with students coming from families with lower social status may be important (Alexander et al. 1987). While schools may be an instrument for social exclusion (Bowles and Gintis 1976; Bourdieu 1977), research on the impact of the social origins of teachers on the school success of students from socioeconomically disadvantaged families is largely missing to date.

5.2 Performance-related characteristics

Debates on teacher recruitment often focus on performance-related indicators, as such indicators can impact the amount of professional knowledge acquired during teacher training and, subsequently, the quality of the teaching. A large internationally comparative study that addresses the cognitive abilities of teachers was published by Hanushek and colleagues (2018). The authors use data from the Programme for the International Assessment of Adult Competencies (PIAAC) to compare teachers' proficiency in numeracy and literacy skills across 31 countries. Because competencies are measured for practising teachers, not student teacher candidates, they are influenced by both learning acquired prior to selection into the job, and on-the-job learning. The authors report that teachers' skills differ widely across countries. For example, they are low in Chile and Turkey, but high in Japan and Finland. In the latter countries, they exceed the skills of non-teachers with a master's or PhD degree in Canada. Overall, median teacher skills across countries are comparable to the skills of other college-educated adults. Interestingly, teachers come from the upper part of the skill distribution of college-educated adults in some countries (e.g. Finland, Singapore and Ireland), but from the lower part in others (e.g. Austria, Denmark, the Slovak Republic and Poland). In a two-country study complementing this line of research, Reimer and Dorf (2014) compared Danish and Finnish student teachers. They reported that Danish student teachers lagged behind their Finnish peers in terms of self-rated mathematics competencies, and discussed this in relation to the attractiveness and selectivity of the teaching profession in both countries. Several studies focusing solely on single countries, such as the United States, found that college graduates with the highest levels of measured ability tend not to go into teaching (see Guarino et al. (2006) for a review of US studies). Two of these studies found that this holds primarily for elementary school teachers as opposed to secondary school teachers. Similarly, Neugebauer (2013) found that student teachers studying to become upper secondary school teachers in Germany did not differ from students in non-teaching fields in terms of their prior academic achievement. However, students aiming to become teachers at the primary or lower secondary level showed lower levels of high school performance compared to both future upper secondary school teachers and other university students. In an important addition, Roloff-Henoch et al. (2015) assessed the cognitive abilities of future teachers and other university students in Germany with a test of reasoning skills, controlling for fields of study. Their findings showed no negative selection into teaching when the study major is controlled for. Rather, all students with non-STEM study majors showed lower cognitive abilities than their peers in STEM (science, technology, engineering and mathematics) majors. In recent years, debates on teacher recruitment have intensified as 'some countries (...) express concern about the quality and motivation of a proportion of teacher trainees' (OECD 2005, p. 29). These concerns are mainly based on studies by economists showing that the academic aptitude of future teachers has been declining relative to other college-educated workers over the past decades in the United States,

United Kingdom and Australia (Bacolod 2007; Corcoran et al. 2004; Hoxby and Leigh 2004; Lakdawalla 2006; Leigh and Ryan 2008; Nickell and Quintini 2002; Stoddard 2003). The most frequently mentioned explanation for declining aptitude is related to shifts in earning opportunities outside of teaching. Bacolod (2007) tested this hypothesis with US data and found indeed that where teacher wages became relatively less attractive, both men and women were less likely to choose teaching as their occupation, especially those with high academic aptitude. In contrast to these studies, Neugebauer (2015) found no earnings decline over the past three decades in West Germany, especially not for women teachers, who have even gained an earnings advantage over other university-educated women. Accordingly, academic aptitude of teacher candidates compared to other university graduates has not declined. In all cohorts, teacher graduates score between 0.17 and 0.27 standard deviations below the other university graduates, a significant but relatively small difference.

5.3 Interests and motivation

Individual interests and motivations are important factors in the context of vocational choices (Holland 1997). They also offer insights into the commitment of future teachers to their teacher training, and, subsequently, into their engagement in the classroom (e.g. Richardson and Watt 2006). In their reviews of studies conducted in the United States between 1960 and 1990, Brookhart and Freeman (1992) found that altruistic (e.g. helping others) and other intrinsic motivations (e.g. interest in teaching subjects) are named most frequently, while extrinsic motivations (e.g. job security) are mentioned less often. The importance of altruistic and intrinsic motivations has been confirmed by more recent studies from a wide range of countries, as Heinz (2015) showed in her review. A recent cross-national study among teacher candidates in Australia, the United States, Germany and Norway applied the Factors Influencing Teaching Choice (FIT-Choice) scale to show that the highest rated motivations for the choice of a teaching career were intrinsic value, perceived teaching ability, a desire to make a social contribution, and to work with children or adolescents (Watt et al. 2012). Motivations are relatively similar across countries. However, the literature has identified some differences between subjects taught, educational levels and gender. For example, female candidates tend to report more child-centred motivations (Heinz 2015). Furthermore, motivations to choose teaching are influenced by labour market conditions. In times of high unemployment risk for teachers, the likelihood of entering teaching was especially low for individuals with pronounced extrinsic job security motivations. This changed markedly when employment prospects became auspicious (Neugebauer 2015). The studies mentioned typically failed to compare future teachers to those choosing alternative careers. However, several country studies that included a comparison group of individuals opting for different careers found that the general impression holds: future teachers are characterized by higher social interests and altruistic and intrinsic motivations (e.g. Denzler and Wolter 2009; Roloff-Henoch et al. 2015).

6. Summary and conclusion

The quality of an education system ultimately depends on teachers. If a country does not recruit able teachers then the average quality of its teaching will be poorer and, other things being

equal, so too will the educational opportunities of its students. While most scholars agree on these premises, sociologists have largely ignored teachers in their research. Against this background, this chapter aimed to increase the attention sociologists give to teachers. To this end, it synthesized and highlighted research, mostly from neighbouring disciplines, on three central questions: How important are teachers for student learning? What observable teacher characteristics foster students' learning gains? Who self-selects into the teaching profession? The importance of teacher effects can be estimated by means of VAMs developed by educational economists. A review of the value-added literature suggests that teachers differ widely in how much they contribute to student learning over a school year, and that teachers can have a long-lasting impact on the educational and occupational trajectories of their students. Less clear is the evidence on the observable characteristics of teachers that foster student learning. The review revealed that this is partly due to the fact that many studies to date have relied on proxy indicators for 'teacher quality', the selection of which was based on availability in administrative datasets, not theory. More theory-driven approaches that have developed and tested a multidimensional teacher competence portfolio have led to more promising results. In particular, teachers' content and pedagogical content knowledge contribute to student learning gains. The review also highlighted that the identification of teacher characteristics that predict student learning is difficult, not only because student learning is influenced by a wide range of factors, but also because of the temporal and conceptual distance between teacher characteristics and students' learning gains. After having clarified some ways in which teacher competence can improve student learning outcomes, I considered how teachers acquire competence. Theoretical models that are rooted in general models of learning (Sørensen and Hallinan 1977) suggest that in addition to high-quality teacher training, the individual pre-training characteristics of teacher trainees play an important role in the development of teacher competences. In view of this, the chapter reviewed sociodemographic and performance-related characteristics, as well as the interests and motivations of those entering teaching or working as teachers. To map out general themes, and differences and similarities across countries, the review focused on internationally comparative studies, supplemented by selected country studies. The choice to enter teaching can be conceptualized as a rational choice. Overall, those attracted to the profession are more often female, and from an ethnic majority, and their families' social origins tend to be lower. For several countries, prior academic performance or academic skills of future teachers tend to be lower compared to those opting for other academic careers; however, this is not always true, and there are important differences with respect to the subject and school level that candidates aspire to teach. Furthermore, the median teacher skills across countries, as measured by PIAAC, were comparable to the skills of other university graduates. Generally similar across countries, future teachers are characterized by higher social interests and altruistic/intrinsic motivations than others.

Questions about social, gender and ethnic inequalities in education are at the centre of sociological education research, as illustrated by the compilation of this volume. Surprisingly, however, little attention is paid to the role of teachers in this respect. I have pointed to a few of the ways in which teachers can influence the degree of inequality, namely the 'mismatch' of teacher and student characteristics (e.g. same-race teachers versus other-race teachers). However, there are various other ways in which teachers can influence the emergence of primary effects, that is, social, ethnic/racial or gender differences with respect to academic

performance or grades. For instance, if effective teachers are more likely to teach in schools or tracks that attract students from privileged family backgrounds, this will enhance unequal educational opportunities. Furthermore, teachers can influence the magnitude of secondary effects, that is, the unequal educational choices that families often make in conjunction with teachers. For instance, if teachers consider the sociodemographic backgrounds of students when recommending a school track, inequality is likely to increase. More research is warranted along these lines.

In summary, when looking for ways to achieve improvements in both average student performance and equality in the sociodemographic distribution of success, an obvious approach is to concentrate on the teacher.

Note

1. Research often differentiates between ‘teacher’ or ‘input’ variables, such as their knowledge, and ‘teaching’ or ‘process’ variables, like cognitive activation in the classroom (Goe 2007). The following overview is limited to teacher variables. Among others, Seidel and Shavelson (2007) provide a summary of the effectiveness of ‘teaching’ variables. I focus in this section on studies measuring learning outcomes longitudinally and controlling for previous knowledge. Only these studies are able to differentiate between selection bias and the actual teacher impact in the classroom.

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