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Chapter 1
Introduction: Student Achievement and Equity Over Time in the Nordic Countries

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1.1 Introduction

This book examines teacher practices in primary school by exploring the content teachers cover in their teaching, the quality of their teaching, and their assessment practices. The aim is to examine how these practices are related to achievement and changes in achievement in mathematics and science over time, as well as how they are related to educational equity in the Nordic countries. Hence, it is important to provide a backdrop for the book with regard to student achievement, the changes in these achievements, and the inequalities in outcomes over time, in the Nordic countries.

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The purpose of this chapter is twofold: (1) to provide the rationale and aims of the book along with an overview of the subsequent chapters, and (2) to establish the necessary backdrop for the book. Section 1.2 outlines the rationale and aim of the book along with a summary of the chapters. Section 1.3 describes the backdrop in terms of achievements and inequalities, comprising a theoretical foundation for equity (Sect. 1.3.1), and three empirical sections (Sects. 1.3.2, 1.3.3, and 1.3.4). Section 1.3.2 presents student achievements and standard deviations, Sect. 1.3.3 examines inequalities among students from minority groups, and Sect. 1.3.4 provides results on inequalities related to students' socioeconomic backgrounds. All empirical sections provide results for the Nordic countries over time. The concluding remarks are presented in the final section (Sect. 1.4).

1.2 The Rationale of the Book and Overview of Chapters

The rationale behind the book lies in the need for more research on teacher practices in the Nordic context. Despite the importance of teacher practice in facilitating effective and equitable learning (Kyriakides et al., 2018; Wahlström, 2022), most research examining different factors of teacher practice and their relationships to student outcomes has taken place outside of the Nordic countries, often in Germany or the United States, and are predominantly focused on secondary education (e.g., Fauth et al., 2021; Kane & Staiger, 2012; Praetorius et al., 2017; Schmidt et al., 2008). Consequently, there is a gap in research in this field for primary schools in the Nordic countries. Accordingly, in order to maintain the Nordic model of education where equity, equal opportunity, and inclusion play critical roles in schooling (Frønes et al., 2020), the Nordic countries need further investigation into these key educational factors. Better knowledge in these areas may strengthen policy and practice to better face the school and societal challenges of today and the future. Such knowledge is even more urgent than ever before, due to the assumed recent increase in educational inequalities caused by the COVID-19 pandemic. To this end, school subjects within the science, technology, engineering, and mathematics (STEM) field, are especially important in preparing students for challenges and opportunities for sustainable development.

To fill this gap in the Nordic educational policy and practice, but also within research in general, it is crucial to understand what makes a teacher practice effective and equitable in mathematics and science education. In this regard, in this book, we focus on *what teachers teach* (content coverage), *how teachers teach* (teaching quality), and *how teachers assess their students* (assessment practice). Specifically, it is crucial to understand to what extent teaching quality and assessment practices, as well teaching content, have changed over time, which aspects are related to student learning outcomes and educational equity, and whether changes in these practices are related to changes in student learning outcomes over time. Such knowledge may also

contribute to addressing the inequalities in the development of student mathematics and science learning outcomes in the Nordic countries. Increased knowledge in these areas could potentially bring the countries closer to a more unified Nordic model of education in terms of equitable outcomes.

The overall aim of the book is hence to examine how teacher practices change over time, how they are related to student outcomes, whether changes in teacher practices are related to changes in achievement, and how teacher practices are related to equity in the Nordic countries. To address this aim and fill the existing knowledge gap related to the Nordic countries and primary school education, this book uses data from IEA's (International Association for the Evaluation of Educational Achievement) Trends in Mathematics and Science Study (TIMSS), in which the Nordic countries participated. TIMSS measures students' competence in mathematics and science according to the participating countries' curricula in grades four and eight. TIMSS is a trend study conducted every four years, enabling comparisons over time. While all Nordic countries (except for Iceland) participated in the study for grade four, only two countries participated in the study for grade eight between 2011 and 2019 (Mullis et al., 2020). Hence, in order to include as many Nordic countries as possible and to consider the lack of research in primary school settings, we selected grade four for analysis. Furthermore, TIMSS has representative samples of students and is the only international large-scale assessment (ILSA) that includes intact classrooms of students and teacher questionnaires, linking each student and classroom to their respective teacher (Martin et al., 2020). Given these reasons, TIMSS is deemed the most suitable ILSA for studying teacher practices in the Nordic context (for more information on TIMSS, see Chap. 3).

To study teacher practices over time, the book focuses on the cycles of TIMSS conducted in 2011, 2015, and 2019. These last three cycles provide the most comparable measures of contextual information, such as teacher practices and student characteristics. Earlier cycles were not included due to potential changes in the measures that could compromise the validity of inferences.

The structure of this book is illustrated in Fig. 1.1 and follows the main aims described above. While the present chapter establishes the contexts of the Nordic countries in terms of achievements and equity, Chap. 2 provides the theoretical foundation of the book by describing the conceptualizations of teacher practices and reviewing previous research. Chapter 3 describes the methodological aspects of the book, including the design and frameworks of TIMSS as well as the analytical methods employed.

As illustrated in Fig. 1.1, the book organizes the empirical chapters according to three approaches. The first approach, "relations to outcome in 2019," investigates the relations between teacher practices and student achievements in mathematics and science, as well as the changes in the *means* of the variables measuring teacher practices over time. This section focuses on content coverage (Chap. 4) and teaching quality and assessment practices (Chap. 5). The second approach, "explaining changes in achievement over time," investigates whether changes in teacher practices are related to changes in achievement from 2011 to 2019. This approach is used to investigate content coverage (Chap. 6) and teaching quality

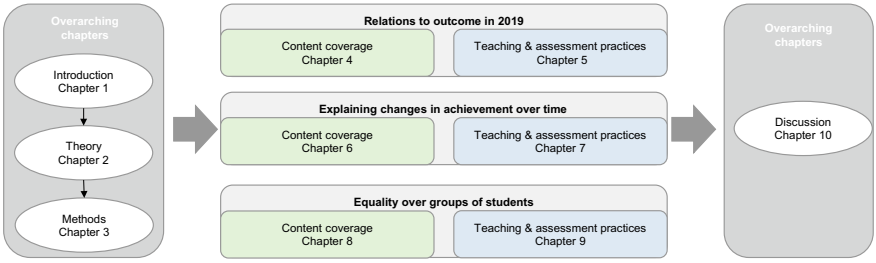

Fig. 1.1 Structure of the book according to three empirical approaches

and assessment practices (Chap. 7). In the third approach, "equality over groups of students", the authors examine how teacher practices are related to inequity. This analysis is used to investigate content coverage (Chap. 8) and teaching quality and assessment practices (Chap. 9). The final chapter serves as an overarching chapter that discusses the findings from the empirical chapters (Chap. 10).

Seeing how the overarching assumption of the book rests on the interconnection between teacher practices and achievement and equity, it is important to provide information about the current state as well as changes in achievement and equity over time in the Nordic countries. This backdrop facilitates the interpretations of findings from the chapters and is presented in Sect. 1.3.

1.3 Achievements and Inequity in Achievements Over Time

This section starts by discussing theoretical perspectives on equity in education, including a discussion on the Nordic model of education (Sect. 1.3.1). It is followed by three empirical subsections that present results on achievements and standard deviations over time (Sect. 1.3.2), the relation between student minority status and achievement over time (Sect. 1.3.3), and the link between socioeconomic status (SES) and achievement over time (Sect. 1.3.4).

1.3.1 Theoretical Considerations on Equity in Education

Generally, the term *educational equity* denotes the provision of equal opportunities for all students, irrespective of their SES, gender, ethnicity, cultural background, or cultural capital, as defined by Bourdieu and Wacquant (2002). It embodies the principle that pedagogical practices and policies should strive to eliminate disparities in educational access, motivation, sense of belonging, well-being, and, importantly,

learning outcomes among students from diverse backgrounds. The principle of educational equity therefore advocates for equal opportunities for all students to reach their full potential, regardless of their sociodemographic circumstances.

The understanding of social inequity is intricately linked to various normative considerations concerning the demarcation between just and unjust disparities in society. Based on a synthesis of the different discussions on the concept of equity (see e.g., Espinoza, 2007; Hansen, 1973; Pedersen, 2014; Sen, 1980, 2008; UNESCO, 2015), it can be argued that achieving fair and socially just educational equity at a societal level necessitates a commitment to consistent equity when addressing learning outcomes across groups of students characterized by various external factors, such as SES, gender, language spoken at home, or ethnic origin. By comprehending and addressing the root causes of inequity, policymakers and educators can endeavour to create a more equitable and just educational system.

Educational equity is inherently linked to matters of social justice and human rights, grounded in the belief that education is a public good that benefits both individuals and society at large. From the vantage point of individual learners, access to high-quality education not only pertains to their personal growth but also contributes to fostering a more inclusive and equitable society. Moreover, this approach may potentially enhance a society's economic growth and social cohesion (Burroughs et al., 2019; OECD, 2012).

According to the OECD (2012) and their findings from the Programme for International Student Assessment (PISA), effective educational institutions require a proper blend of skilled staff, sufficient educational assets, and motivated learners, with resources allocated accordingly. The OECD's findings indicate that disadvantaged students often attend schools with limited resources, impacting various aspects of education. Thus, equitable distribution of resources must be considered in school systems (OECD, 2012). As Esping-Andersen (2008) formulates, "The point is that welfare and efficiency concerns coincide. From an equity perspective, children's life chances should depend less on the lottery of birth than on their own latent abilities" (p. 23). Skilled teachers and school resources are pivotal to the learning opportunities of the individual. As such, teachers play a substantive key role in whether *all* students experience equal opportunities to learn. Still, the question of equal opportunities for all is a composite concept. Do equal opportunities also imply equal outcomes for all students despite diversity in their characteristics, interests, effort, or innate potentials? Or is it a question of providing the same opportunities for all? In this matter, we would argue for the importance of the concept of educational equity in decision-making and teacher practice, while additionally, recognizing the challenges involved in achieving it. Nevertheless, schools face different obstacles in fulfilling this ambition.

A focus on equity implies that a specific allocation must be substantiated through a combination of references to abstract principles and tangible evidence. Equity entails examining the social justice implications of education, particularly the fairness, justness, and impartiality in the distribution of resources and opportunities across all levels or sectors of education. In this context, equity is understood as the fair or justified allocation of resources or opportunities (UNESCO Institute for Statistics, 2018).

The Nordic Educational Model

The focal Nordic countries in this book, comprising Denmark, Finland, Norway, and Sweden, are widely recognized for their extensive welfare systems that emphasize equal opportunities and social justice, contributing significantly to their development. These countries frequently receive recognition for their dedication to social justice and equity, particularly within the realm of education. This commitment is most evident during the classical period of the Nordic educational model, which spans from the post-World War II era until the 1970s. During this period, "the main objective was to involve the school in the realisation of social goals such as equal opportunity and community fellowship" (Telhaug et al., 2006, p. 245). Consequently, one might anticipate strong educational equity within the Nordic countries. Nevertheless, a comparative analysis of these countries reveals opportunities for further improvement in achieving this overarching ambition (see Frønes et al., 2020; Nilsen et al., 2018; OECD, 2019).

Within the Nordic welfare state, diverse forms of equity have been explicitly pursued as political objectives. This normative ambition materializes in numerous manifestations, but as Hansen (1986) contends:

> The Scandinavian welfare state has not only searched for the elimination of poverty, but the decrease of inequality as well. When economic growth policy and the struggle against mass poverty are combined with the demand for equality, one finds the combined elements in a social development policy that justify talk of a Scandinavian development model in the form of a vision as an ideological driving force. (p. 109)

The overall emphasis on equity in the Nordic countries described by Hansen is well in line with the developments of a Nordic educational model. The Nordic education model, which sought to balance equity and excellence for all children, arguably peaked between the 1960s and 1980s. During this post-war era and up to the 1980s, Nordic countries were guided by social democratic parties advocating for a welfare state that prioritized equity, justice, and democracy (Tröhler et al., 2022). In the time period examined in this book (2011–2019), the Nordic countries continued to prioritize educational equity. However, the spirit, focus, and emphasis on equity have decreased since the model's peak, due to a number of factors (Frønes et al., 2020). For instance, Sweden implemented free school choice in the early 1990s (Yang Hansen & Gustafsson, 2019), and there have been shifts in the policy and with accumulating evidence of decreased equity in several of the Nordic countries (Yang Hansen & Gustafsson, 2019; Nilsen et al., 2018; OECD, 2019). It is thus important to provide an overview of the development of equity in the Nordic countries over time, as explored in the three following empirical subsections.

1.3.2 *Results: Student Achievement and Standard Deviation in the Nordic Countries*

Historically, the claim of an equity-efficiency trade-off, in which improvements in overall student achievement come at the expense of a more equitable distribution of educational resources, has been a topic of debate. However, contemporary empirical evidence challenges this idea. In fact, recent findings demonstrate a positive correlation between enhanced educational equity and higher average student performance (e.g., Burroughs et al., 2019; Kyriakides et al., 2018).

Figures 1.2 and 1.3 illustrate the changes in mean achievement for mathematics and science across the TIMSS cycles (2011, 2015, and 2019) in the Nordic countries (excluding Iceland). These figures depict both significant positive trends and downturns over time. For mathematics, Sweden's achievement increased from 2011 to 2019, while Denmark and Finland experienced the opposite trend. In the case of Norway, their target grade changed from grade four to five in 2015, and hence their grade four achievements have been left out. Norway changed the target population of students from grades four and eight to grades five and nine to improve its comparability to other Nordic countries (Bergem et al., 2016; Kavli, 2018). Specifically, whereas Norwegian children start primary school at the age of six, Swedish, Danish, and Finnish children start primary school at the age of seven. As illustrated in Fig. 1.2, Norway's mathematics achievement in grade five decreased from 2015 to 2019.

In science, as depicted in Fig. 1.3, Denmark and Finland's achievements declined from 2011 to 2019. There were no significant changes for Norway between 2015 and 2019, while Sweden's achievement increased from 2011 to 2019. Sweden was

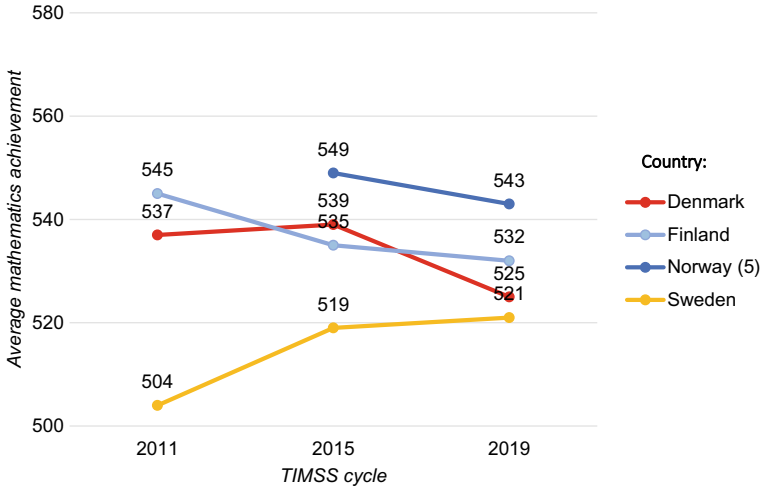

Fig. 1.2 Mathematics achievement in the Nordic countries over time

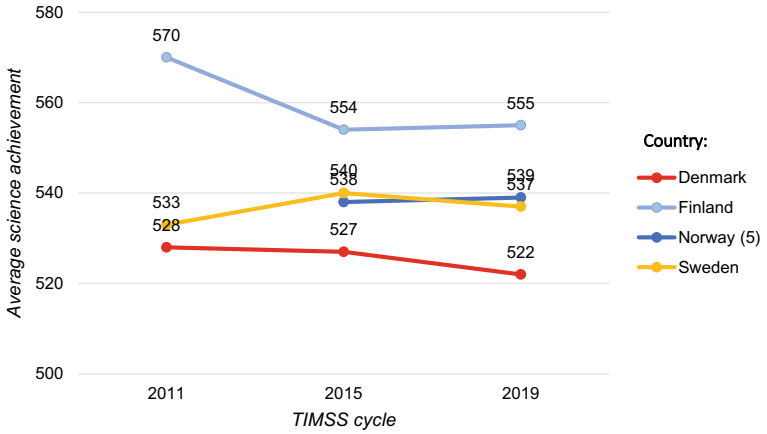

Fig. 1.3 Science achievement in the Nordic countries over time

the only country in this group to observe increased achievements in both science and mathematics from 2011 to 2019.

It is important to note that Iceland did not participate in TIMSS. They did participate in PISA. However, results from PISA are not comparable with results from TIMSS, as PISA measures mathematics and science literacy for 15-year-old students, while TIMSS measures students' competence in mathematics and science according to the participating countries' curricula in grade four (and eight).

To contextualize these changes in achievement, it is helpful to consider the standard deviation within the TIMSS scale. The scale was established in 1995 with a mean of 500 for participating countries and a standard deviation of 100 score points. The standard deviation is generally viewed as an indicator of educational equality and reflects the dispersion of students' achievement (Ferreira & Gignoux, 2014). Across these countries, a descriptive examination of the changes from 2011 to 2019 reveals an increased spread in student achievement in mathematics, as evidenced in Fig. 1.4. The results are more mixed in science (see Appendix 1 for all standard deviations and their standard errors in mathematics and science).

The increased standard deviation for the Nordic countries over time reflected in Fig. 1.4 warrants attention, as it suggests that teachers may be faced with heightened demands for differentiating instruction in classrooms where students' competencies exhibit greater variation than in the past.

Summary

The pattern across the Nordic countries points to declining achievements and an increased dispersion over time among students. This finding aligns with previous research highlighting the correlation between equity and achievement (e.g., Burroughs et al., 2019). It further points towards a negative trend in equity for the Nordic countries.

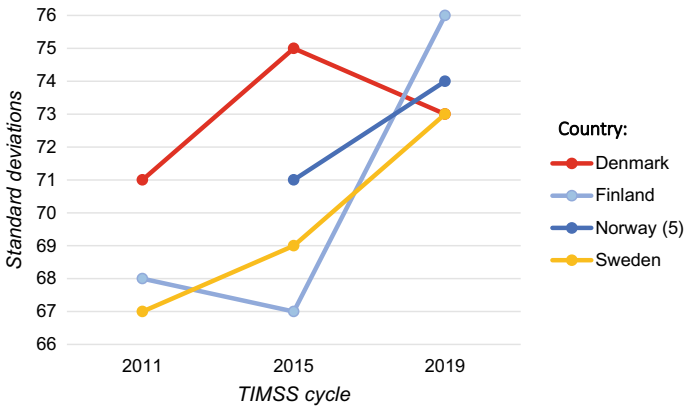

Fig. 1.4 Standard deviations in mathematics achievement in grade 4 (and grade 5 in Norway) in the Nordic countries over time

1.3.3 Results: Differences in Student Achievement Related to Language Spoken at Home

Whether the language spoken at home is the same as that of teachers' instruction can be regarded as a proxy for multiple dimensions of socioeconomic background and cultural capital, as posited within Pierre Bourdieu's theoretical framework (see e.g., Bourdieu & Wacquant, 2002). This framework suggests that the language spoken at home is not only indicative of SES and cultural capital but also has a more direct association with the overall process of language acquisition.

We first look at the proportions of students and the significant differences in the percentages of students who "sometimes" or "never" speak the language of the test at home over time and between countries. Note that the two categories "sometimes" and "never" were collapsed due to the small number of students in the "never" category.

Figure 1.5 presents the percentages of students in TIMSS who "sometimes" or "never" spoke the language of the test at home in the Nordic countries over time (for more detailed information, including standard errors, see Appendix 2).

The changes in the proportion of students predominantly using a language other than the national language at home present an intriguing phenomenon, particularly in the context of the most recent TIMSS cycle (2019). Our analysis reveals a statistically significant disparity in 2019 between Sweden on the one hand, and Norway and Finland on the other hand. For example, there were nine percentage points more Swedish students who "sometimes" or "never" speak the national language at home compared to Norway, and seven percentage points more compared to Finland. Upon examining the longitudinal changes within Sweden, a considerable divergence between 2015 and 2011 was observed. Overall, nearly one-fifth of all Swedish students fall under the category of students who "sometimes" or "never" speak the national language at home in all the last three TIMSS cycles. Conversely, Finland

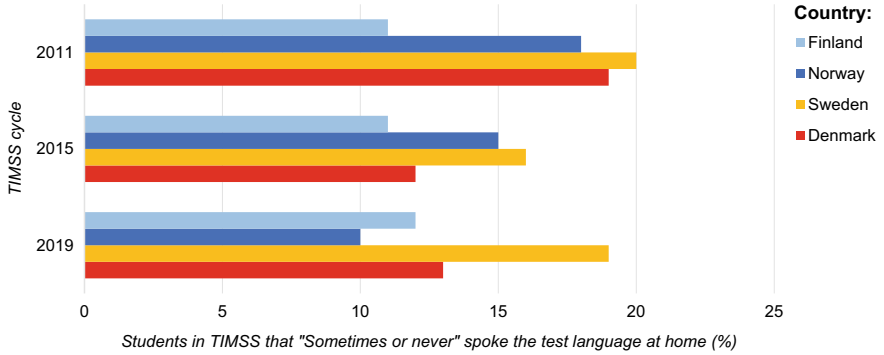

Fig. 1.5 The percentages of students in TIMSS that "sometimes" or "never" spoke the language of the test at home

has persistently maintained a lower proportion of students in this category among fourth-grade participants in TIMSS, as compared to other countries, and this pattern has remained stable across successive cycles.

Figure 1.6 presents the mean achievement gaps over time between students who "always" or "almost always" speak the language of the test at home and students who "sometimes" or "never" do. Substantial and statistically significant differences are found, with variations across cycles and subjects. The gap in science achievement is consistently higher than that of mathematics in all cycles and countries. One plausible explanation is that language accounts for more of the variance in science than mathematics because more advanced language skills are required in science.

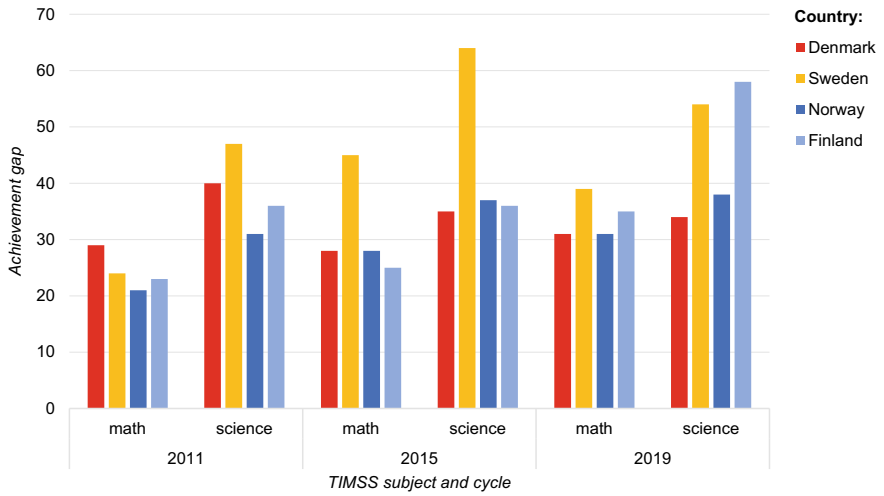

Fig. 1.6 Gap in the mean achievement between students who speak the language "sometimes" or "never" and "always" or "almost always" at home

There is a strong tendency for higher achievement gaps over time. This trend is evident from 2011 to 2019 across all countries and in both subjects, except for Denmark, where the achievement gap in science decreased over time.

The effect sizes of the gaps illustrated in Fig. 1.6, range from 0.30 percent in Norway in 2011 for mathematics to as high as 0.87 percent for science in Sweden in 2015 (see Appendix 3). A study by Hill et al. (2008), which analyzed annual mandatory assessments of American students, found an effect size 0.52 percent for the transition from third to fourth grade and 0.56 percent for the transition from fourth to fifth grade. These effect sizes are similar to the gaps illustrated in Fig. 1.6 and are presented in a table in Appendix 3, indicating that the achievement gaps reflect about one year of schooling between majority and minority language students (i.e., those who speak the language of the test "always or almost always" at home) and minority language students (those who speak the language of the test "sometimes" or "never" at home).

Summary

Section 1.3.3 investigated inequities associated with minority status, as indicated by students who "sometimes" or "never" speak the national language at home. The number of minority students varies across cycles and over countries, and the differences between the countries are especially striking. Similar to the results for the standard deviations, which indicated a tendency towards less equity over time for the Nordic countries, the findings for achievement gaps between majority and minority students also revealed a widening gap from 2011 to 2019, indicating a negative trend for equity.

1.3.4 Results: Variance in Achievements Explained by SES

The significance of socioeconomic background can be discerned through various approaches, pertaining not only to the conceptualization, operationalization, and quantification of socioeconomic background but also to the manner in which the computed estimations are correlated with student performance (Mittal et al., 2020). In large-scale assessment studies, such as TIMSS, the explained variance in a linear regression between achievement and one or multiple socioeconomic background variables is frequently utilized (e.g., Allerup et al., 2016; Mittal et al., 2020; Reimer et al., 2018; Strietholt & Strello, 2022).

In the TIMSS 2015 and 2019, a scale for home resources for learning has been developed, which offers insights into students' socioeconomic backgrounds. However, this scale has a large amount of missing data for some countries and is not available for Denmark for TIMSS 2011. Hence, when examining the changes across the three TIMSS cycles (2011, 2015, and 2019), we use the number of books in the students' home as this has previously been shown to be a valid and powerful proxy for student SES (Allerup et al., 2016; Gustafsson et al., 2011).

The concept of equal opportunity posits that the distribution of educational resources should be equitable, regardless of factors that ought to be inconsequential, such as gender, race, wealth, or geographical location. Within this context, both the gap analysis, which focuses on disparities across various groups, and the proportion of variance explained by student characteristics and home background (R^2) are found to be relevant indicators.

Figure 1.7 shows the proportion of variance in mathematics and science achievement explained by the number of books at home. A noticeable discrepancy can be observed in the variance explained by this variable across subjects; SES accounts for a greater proportion of the variation in student outcomes in science compared to mathematics. Furthermore, significant differences can be observed over time and across countries. At one end of the spectrum, the explained variance in students' mathematics scores in Finland in 2011 is a mere six percent in mathematics, while at the other end, Sweden demonstrates a considerably higher percentage of 14 percent in 2019 for mathematics.

Furthermore, Fig. 1.7 shows that a greater percentage of the variance in achievement is explained by the number of books at home in 2019 compared to 2011. This indicates a decrease in equity in the Nordic countries during this time period, and that students' home backgrounds matter more and more to their achievements.

Summary

This section examined the variance in student achievement explained by SES, as indicated by the number of books at home. The results point to less equity over time

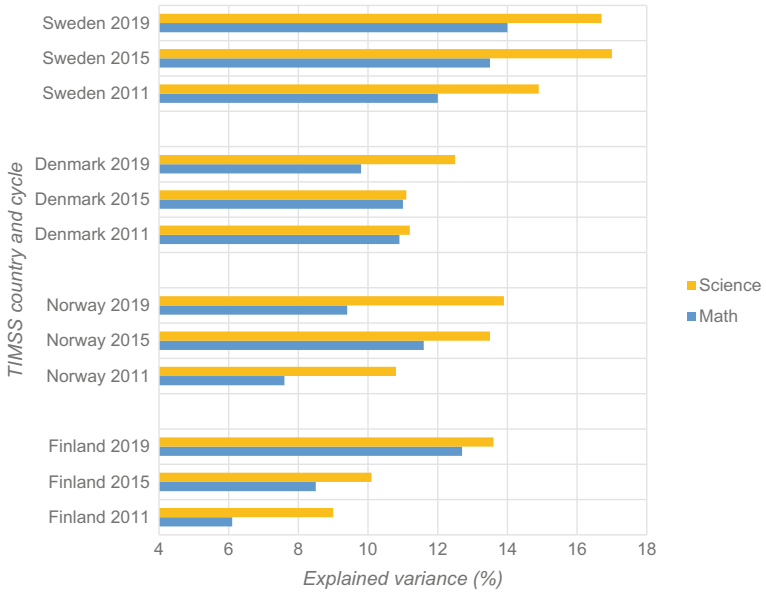

Fig. 1.7 Percent explained variance by the number of books at home in mathematics and science

for the Nordic countries since more variance is explained in 2019 than in 2011. The situation shows more pronounced differences in science compared to mathematics, and the results suggest a potential association between the achievement gap and the language spoken at home.

1.4 Conclusion

In this chapter, we have presented the rationale, aim, and structure of the book. Seeing how the main aim of the book is to investigate how teacher practices are related to achievement and equity over time, the chapter further provided the backdrop for the book in terms of achievements and inequalities in achievements for the Nordic countries. Various theoretical considerations concerning equity in education were discussed, supported by empirical insights at the national macro level. These empirical insights included student achievement over time, as well as three indicators of equity: the standard deviation of achievements as a measure of dispersion, language spoken at home as an indicator of minority, and number of books at home as an indicator of SES. All three indicators of equity suggest a negative development over time for the Nordic countries, along with a negative development of achievement.

The decreasing equity and achievements are in line with previous research that found correlations between the two (Burroughs et al., 2019; Kyriakides et al., 2018). Sweden, however, is an outlier and does not follow this pattern. Sweden was the only country with increased achievements in mathematics and science, while at the same time being the least equitable of the Nordic countries. One explanation could be that other factors, stronger than exogenous student characteristics, have promoted positive achievement trends in Sweden. Teachers are the heart and key of student learning, and Sweden has invested substantially in teacher education and professional development (Boesen, et al., 2015; Ringarp & Parding, 2018). In general, teachers have the potential to increase achievements and equity among students (e.g., Darling-Hammond, 2018; Praetorius et al., 2017). Yet, the disturbing picture emerging from our findings of negative trends for both achievements and equity in the Nordic countries, suggests that it is critical to examine *how* teachers may promote learning and equity in the Nordic countries. This is especially important to rectify the damages of the pandemic and counter further negative developments in these challenging times.

Appendices

Appendix 1 Standard Deviations with Standard Errors in Parentheses

	2019				2015				2011			
	Mathematics		Science		Mathematics		Science		Mathematics		Science	
Denmark	73	(1.1)	68	(1.1)	75	(1.6)	69	(1.3)	71	(2.0)	73	(1.9)
Finland	76	(1.4)	71	(1.5)	67	(1.2)	65	(1.7)	68	(1.5)	67	(1.5)
Norway	74	(1.4)	67	(1.4)	71	(1.4)	63	(1.5)	68	(1.9)	63	(1.3)
Sweden	73	(1.5)	74	(1.9)	69	(1.7)	73	(2.5)	67	(1.3)	75	(1.3)

Note Norway uses grade 4 as the target population in 2011. In 2015, Norway changed the target population to grade 5 to enhance comparability with other Nordic countries

Appendix 2 Percentages of Students Reporting on Language Spoken at Home in the TIMSS 2011, 2015, and 2019 Student Questionnaires for Mathematics

Country	Always or almost always	Sometimes or never
2019		
Denmark	87 (0.8)	13 (0.8)
Sweden	81 (1.4)	19 (1.4)
Norway	90 (0.7)	10 (0.7)
Finland	88 (1.0)	12 (1.0)
2015		
Denmark	88 (0.8)	12 (0.8)
Sweden	84 (1.3)	16 (1.3)
Norway	85 (1.2)	15 (1.2)
Finland	89 (0.7)	11 (0.7)
2011		
Denmark	81 (1.0)	19 (1.0)
Sweden	80 (1.0)	20 (1.0)
Norway	82 (1.1)	18 (1.1)
Finland	89 (0.7)	11 (0.7)

Note Responses for TIMSS have been recoded into a dichotomous variable with 1: "always or almost always" and "sometimes or never"

Appendix 3 Gap in Mean Achievement Between Students Who Speak the Language "Sometimes or Never" and "Always or Almost Always" at Home

Country	Mathematics			Science		
	Diff. in mean score	Cohen's *d*		Diff. in mean score	Cohen's *d*	
2019						
Denmark	31 (4.6)	0.42	***	34 (4.7)	0.50	***
Sweden	39 (5.3)	0.54	***	54 (5.1)	0.74	***
Norway	31 (4.6)	0.42	***	38 (4.4)	0.56	***
Finland	35 (5.3)	0.45	***	58 (4.4)	0.79	***
2015						

(continued)

(continued)

Country	Mathematics			Science		
	Diff. in mean score	Cohen's *d*		Diff. in mean score	Cohen's *d*	
Denmark	28 (5.2)	0.37	***	35 (4.9)	0.49	***
Sweden	45 (5.8)	0.64	***	64 (5.9)	0.87	***
Norway	28 (5.9)	0.39	***	37 (6.5)	0.58	***
Finland	25 (6.2)	0.35	***	36 (5.7)	0.52	***
2011						
Denmark	29 (5.3)	0.41	***	40 (6.0)	0.54	***
Sweden	24 (4.0)	0.36	***	47 (4.6)	0.63	***
Norway	21 (4.0)	0.30	***	31 (4.2)	0.49	***
Finland	23 (5.6)	0.33	***	36 (6.5)	0.52	***

Note Responses for TIMSS have been recoded into a dichotomous variable with 1: "always or almost always" and "sometimes or never". *** denotes that the significance level $p < 0.001$

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