DEPARTMENT OF EDUCATION AND SPECIAL EDUCATION

Exploring socioeconomic inequality in educational opportunity and outcomes in Sweden and beyond

Victoria Rolfe
University of Gothenburg
Doctoral thesis, defended June 8th 2021

Contact information
victoria.rolfe@gu.se
Department of Education and Special Education
University of Gothenburg
Box 300
405 30 Gothenburg
Tel: +46 (0)31-786 2450

Exploring socioeconomic inequality in educational opportunity and outcomes in Sweden and beyond

For many decades, an important goal of the Swedish school system has been to provide equal educational opportunities in an integrated environment (Arnesen & Lundahl, 2006). This educational model, often referred to as “a school for all”, was shared with Sweden’s Nordic neighbours and was considered central to the Social Democratic welfare state. During the 2000s, however, a socioeconomic performance gap developed in Sweden and more and more students left compulsory school without full grades. Research shows that school segregation in terms of student composition, performance and opportunities for learning has increased (e.g. Mullis et al., 2016; Mullis et al., 2017; OECD, 2016; The National Agency for Education, 2005, 2020a) and so has the importance of family background for student achievement (Löfstedt, 2019).

Educational equality is one of the most important pedagogical and political issues of our time (e.g. Baker et al., 2002; Broer et al., 2019; Jerrim et al., 2019; Keeves, 1992). Promoting social equality through education is a long established global theme in education (Coleman et al., 1990; United Nations General Assembly resolution 70/1, 2015). This dissertation focuses on school equivalence in terms of socioeconomic differences in students’ school performance and opportunities for learning.

Background

Since the beginning of the 1990s, the Swedish school system has undergone several significant changes. It has been reformed in accordance with the principles of market economics, the control of education has been decentralized, and free school choice has been introduced. Since the independent school reform and the free choice of school, the number of independent schools has increased markedly and 15% of the pupils in compulsory school now attend an independent school (The National Agency for Education, 2018a, 2020b). There is a wide range of schools to choose from, with different pedagogical orientations (Lundahl, 2016).

During this reform period, Swedish society also changed. The Swedish welfare system deteriorated and both income disparities (Aaberge et al., 2018) and housing segregation increased (Bevelander, 2004; Malmberg et al., 2016). The proportion of foreign-born citizens also increased markedly (The Swedish Migration Agency, 2018) and the number of pupils who received mother tongue instruction doubled (The National Agency for Education, 2018b, 2018c).

Previous research indicates an increasing segregation regarding Socioeconomic and foreign background between schools (e.g. Söderström & Uusitalo, 2005; Yang Hansen & Gustafsson, 2016) since the introduction of free school choice. Housing segregation explains most of the middle school variation (Holmlund et al., 2014; Malmberg et al., 2016), and this variation is reflected in increased performance gaps at school level (The National Agency for Education, 2020a). Schools in less

privileged areas find it difficult to attract and retain teachers (Borelius, 2010; Möller, 2010), which affects the equality of education and students' opportunities for learning.

Sweden's results in international large-scale studies are currently recovering after a long period of decline (Mullis et al., 2016; Mullis et al., 2017; OECD, 2016). In comparison with other OECD countries, the decline in Sweden's school performance has been among the strongest (Löfstedt, 2019). Although Sweden's results in recent international knowledge surveys have improved, the differences in performance between schools have increased (e.g. Chmielewski, 2019). Sweden's irregular results in international knowledge measurements and large middle school variation make it interesting to study inequality in an international context.

Socioeconomic status (SES) and opportunity to learn (OTL) are the key concepts in this dissertation. SES can be described as ranking an individual or a family in a hierarchy according to their possession or control of resources such as wealth, power or social status (Mueller & Parcel, 1981). SES has a long and well-documented explanatory power in educational science (e.g. Coleman et al., 1966). According to Bourdieu (1986), SES can be expressed through three intertwined aspects: social capital, cultural capital and economic capital. Social capital refers to the family's social connections and networks, cultural capital includes cultural and educational consumption and economic capital refers to economic status. The higher social classes have long had the strongest educational results. Based on Bourdieu's theoretical approach, this is explained by the fact that the education system reproduces the benefits of a higher social class, and that socioeconomically well-positioned parents place greater value on education while having the resources required to ensure their children's success (Goldthorpe, 1996). However, the importance of cultural totems used to indicate socioeconomic status have changed over time (Goldthorpe, 1996), and it is therefore important to consider how socioeconomic status is operationalized before using the term in studies of school equivalence.

For a long time, the measurement of SES has been based on a composition of parental education, occupation, and income (Duncan et al., 1972; Gottfried, 1985; Hauser, 1994; Mueller & Parcel, 1981; White, 1982). In many large-scale international studies, it is common to replace parental income with a measure of home resources (Cowan et al., 2012; Sirin, 2005) and to include additional variables. SES also shows a significant impact on student performance (Lee et al., 2019). However, it is not uncommon for researchers to use individual variables to measure SES (Strietholt et al., 2019). There is disagreement in the literature about which individual SES indicator can best predict school performance: some argue for parental education (Tan, 2017), and others for objects at home (Sirin, 2005).

The concept of OTL is based on the idea that exposure to the subject content will have a strong influence on performance (Eggen et al., 1987), and that the teaching content is associated with the teaching quality and the learning environment (McDonnell, 1995). Many studies have shown that OTL has a positive association with students' mathematics performance (e.g. Dupriez & Dumay, 2006; Fuchs & Woessmann, 2007; Gamoran et al., 1997; Reeves, 2012; Rowan et al., 2002; Schmidt

et al., 2001). As OTL is created through teachers' practice and interpretation of the curriculum (e.g. Porter & Smithson, 2001; Schmidt et al., 1997), the conditions for students' OTL can vary between classrooms and schools. This entails a risk to between-school equality.

The major changes in the Swedish education system since the 1990s can be understood as possible influencing factors in relation to Sweden's fluctuating results in various international large-scale studies, as well as the growing performance gap. In this context, SES and OTL can be used in the analysis to deepen the understanding of changes in equality in Swedish compulsory school.

Purpose

The purpose of the dissertation is to investigate inequality in Swedish compulsory school from an international perspective. The dissertation focuses on the differences in students' performance, socioeconomic background and opportunity to learn, and examines the mechanisms behind them. The dissertation's three studies examine inequality from different perspectives. Study I examines how the concept of socioeconomic status can be operationalized over time in Sweden; Study II explores the interplay between socioeconomic status, the opportunity to learn and achievement - at different times and countries; and Study III focuses on how teacher education (i.e., specialized and non-specialized teachers) affects the relationship between SES, OTL, and performance.

The three studies consistently show the existence of performance differences in Sweden, as well as their persistence over time. The dissertation examines the relationships between students' socioeconomic backgrounds and the opportunities that exist within the classrooms. This relationship is an explanatory factor in relation to this performance gap both internationally and within Sweden. The differences found in Swedish schools provide context for mismatches between the curriculum that is examined in international assessments and the curriculum that is taught in Swedish schools. This forms the basis of the integrated discussion in the dissertation.

Theoretical Framework

The theoretical framework of the dissertation is based on the model for potential educational experiences (Schmidt et al., 1997) and Bourdieu's theory of social reproduction. Firstly, the theoretical framework connects the two main concepts in the dissertation (socioeconomic status and opportunities for learning) via the model for potential educational experiences. Secondly, the model is viewed through a theoretical lens shaped by Bourdieu's theory of social reproduction.

The curriculum has long been considered experiential (e.g. Bobbitt, 1918; Dewey, 1902). As such, the curriculum is based on a series of activities or experiences that students must go through in school on the way to adulthood. Although the student as an individual is at the centre of this description of the curriculum, education is still a communal project with students within classes and classes within schools. As a result, the curriculum must reflect common goals of experience for the participants in

the educational project. The TIMSS model for potential educational experiences illustrates educational experience as a delicate web of multilevel relationships between goals, actors, and choices within the system, classrooms, and individuals (Schmidt et al., 1997). At the system level, curricula are intended. This intended curriculum is designed and often politically controlled at the national level. Within classrooms, the implemented curriculum is planned and implemented by teachers. The achieved curriculum is at the student level and is a result of the implemented curriculum (Houang & Schmidt, 2008; Schmidt et al., 1997). Through a number of goals, countries specify what students should learn, teachers implement these goals to varying degrees within their classes, and students achieve learning to varying degrees. The sum of these measures can then be quantified through student achievement in international large-scale studies (e.g. TIMSS).

The implemented curriculum moderates the relationship between the intended and achieved curriculum. The curriculum that is manifested at class level is an expression of desired experiences in the intended curriculum. This manifested curriculum is opportunity. All choices made at school and classroom level have consequences for opportunities. It is important to understand how educational opportunities are distributed in order to contextualise and understand the achieved curriculum and student performance as well as the performance gap.

The belief that students will perform better in subjects and content that they have learned than those who have not (e.g. Eggen et al., 1987) has long been perceived as an opportunity to learn (OTL) in the IEA studies (see Schmidt et al., 1997). Through the lens in the TIMSS model for potential educational experiences, the OTL measure in the TIMSS survey can be understood as the sum of the many choices made at national, school and classroom level that determine the opportunities that students receive.

In potential educational experiences, the model affects student characteristics both the curriculum achieved and the completed curriculum. Therefore, it is important to consider potential educational experience in relation to students' social origins. The theory of social reproduction is used to understand the role of the student background in education. Within this framework, it is emphasized that education contributes to the reproduction of power relations between social groups (Bourdieu, 1971). Social reproduction has taken place through school since antiquity (e.g. Guillory, 2013; Lloyd, 1990). This link between student background and achievement was not eliminated during the 20th century, despite a focus on comprehensive and meritocratic education (Coleman et al., 1966; Jencks et al., 1972). The persistent link between socioeconomic status and achievement in the literature (e.g. Marzano, 2003; Scheerens & Bosker, 1997; Scheerens et al., 2007) underlines the relationship between student background and experience in modern educational institutions. According to Bourdieu (1998), the family defines an individual's position in the social space. If an individual wants to deviate from the educational path defined by the family's position in the hierarchy, this will require deliberate action. These potential movements at the individual level interact with the educational opportunities expressed at the class level in the model for potential educational experiences. For example, families can move their children to a

better school or accept the school to which they are assigned. Such a movement can affect the opportunities a student receives and whether they experience social reproduction within the school system.

The three empirical studies in the dissertation examine the curricula expectations, delivery, instruction, and results from the system, classroom and student level. The family's socioeconomic status is used to identify the difference in results and the variation in the opportunity to learn in a mediated mechanism.

Method

Since the turn of the millennium, large-scale international studies have become the dominant tool for monitoring and comparing countries' school systems. These studies provide rich and important data on school results and a wealth of contextual information to promote a better understanding of how different education systems work and the mechanisms behind the performance gap (Gustafsson & Rosén, 2014; Nóvoa & Yariv-Mashal, 2003). The dissertation is based on data from two international large-scale studies - PISA (Program for International Student Achievement) and TIMSS (Trends in International Mathematics and Science Study).

PISA examines 15-year-olds' knowledge in reading, mathematics and science and evaluates whether students are equipped with the knowledge and skills necessary to participate in further life. PISA has been conducted every three years since 2000, and tests the knowledge of 15-year-old students from OECD member countries and non-OECD countries (so-called 'partner countries'). Over time, more and more non-OECD countries have participated in PISA, to the extent that they now outnumber OECD member economies in the latest PISA surveys (OECD, 2019). These skills and knowledge are tested by asking students to apply their learning in new situations (OECD, 2019). Each PISA survey has a main area, which rotates every three years (reading in 2000, 2009 and 2018; mathematics in 2003 and 2012 and science in 2006 and 2015), however, the other two subjects are also tested in each PISA round, albeit to a lesser extent.

The TIMSS survey has been conducted every four years since 1995 and tests students' achievements in mathematics and science for students in grades 4 and 8. TIMSS has a curriculum-based assessment framework, which is based on common content knowledge in all participating countries (Mullis et al., 2016). The purpose of the TIMSS survey is to help countries make decisions to improve their teaching and learning in mathematics and science (Mullis et al., 2016).

Both the PISA and TIMSS surveys collect data using rigorous testing procedures. The PISA survey uses a two-step stratified sample design (see e.g. OECD, 2014). In the first step, schools with 15-year-old students are selected. The probability of a school being selected is in proportion to the number of 15-year-olds enrolled in it. The second step in the selection is selected students within the school, with a target group size of 42 students per school (OECD, 2017). A stratified, two-stage, cluster sample design is used in the TIMSS survey. In the first stage schools are chosen, and in the second stage one or more classes within the school are chosen

(Martin et al., 2016). In the majority of countries, the target for sample size is 150 schools and about 4,000 students (Martin et al., 2016). The rigorous procedure is very important for all scientific claims made after analyses of these data. The sample in these studies means that the conclusions from empirical analyses can be generalized to the population of students of the corresponding age.

The choice to use data from both the TIMSS and PISA surveys in the dissertation was motivated by both the objectives of each sub-study and the design of the two international large-scale studies. Since the aim of Study I was to build a measurement model for socioeconomic status, PISA data could be used thanks to the expansive data collection on socioeconomic status within that dataset. The purpose of examining the relationships between socioeconomic status, learning ability, and achievement at multiple time points in Study II required the use of TIMSS data, as the PISA survey has fewer measurement points for each major area. Finally, in order to integrate teacher characteristics into the model of pedagogical inequality in Study III, TIMSS data was necessary because the PISA survey does not provide information from teachers.

Variables

Study I used variables from 6 cycles of PISA survey student questionnaires relating to home resources and family background (a desk, study space, textbooks, educational software, access to own room, internet connection, classical literature, poetry, artwork, number of books in student home, and parents' level of education). In the second and third sub-studies, variables from the TIMSS survey's student and teacher questionnaires were used. Both of these studies used student performance in the TIMSS survey as a result variable. Study II used student achievement in both mathematics and science, but Study III used student achievement in only mathematics. In Study II, the number of books in the student's home and the parents' level of education were used to indicate Socioeconomic status. Variables from the teacher questionnaires were merged to create cycle-specific OTL variables. Because the constructs examined in Study III (socioeconomic status, OTL, teacher quality, and the teacher's perception of the school's emphasis on academic success) were modelled as latent variables, several variables from the student and teacher questionnaires were used.

Method of analysis

One of the most popular methods for statistical analysis in the social sciences is structural equation modelling (SEM). SEM is a framework within which researchers can investigate complex relationships between variables. SEM has many uses. Researchers can, for example, establish a measurement model with confirmatory factor analysis to examine relationships between a theoretical concept through observable indicators. SEM can also investigate complex mechanisms between different concepts by linking measurement models in a structural model according to a theoretical framework. Both measurement models and structural models can

examine relationships between variables at several levels simultaneously (Hox & Bechger, 2007; Hoyle, 2012). Multilevel analysis is applied to take into account the hierarchical data structure. The method breaks down the total variance in an outcome variable according to the observation levels (individual - school) contained in the data and tries to explain the variance at each level. Multilevel analysis has been used in studies II and III.

Several of the concepts in the dissertation are not directly observable, e.g. socioeconomic status, opportunity to learn, and teacher quality. Therefore, confirmatory factor analysis (CFA) is used to define the non-observable concept (latent variable) with several observable indicators, a process requiring a strong theoretical or empirical basis for the selection of indicators and the model specification (Brown, 2015). CFA also provides a strong framework for comparing measurement models across groups and time (i.e., between cohorts at different time points) through multi-group confirmatory factor analysis (MGCFA). MGCFA integrates several groups into a single model and provides a basis for comparisons between groups (Brown, 2015). The Measurement Invariance (MI) method is often applied to validate measurement models comparability by testing whether (1) factor structure is identical (Configural Invariance); (2) factor charge for each indicator is equal (Metric Invariance); (3) expected values (i.e., the intercept) for each indicator are equal (Scalar Invariance). This process is necessary for researchers to be able to make legitimate comparisons between cohorts (Cheung & Rensvold, 2002). To compare mean values and the variance of latent variables between subgroups, Scalar Invariance is required (Millsap, 2012). However, this assumption (i.e. equal factor loadings and intercept of the indicators) often fails. In addition, chi-^{2} difference testing for each parameter becomes very cumbersome, especially when many subgroups are compared. Therefore, the dissertation uses a newly developed method - the alignment approach- to evaluate the invariance of measurement models. The alignment method enables comparison and assessment of measurement equivalence across a large number of groups and subgroups within populations and allows partial invariance in the parameter estimates (Asparouhov & Muthén, 2014; Munck et al., 2017). The alignment method is based on the configuration model and estimates the individual factor mean and variance for each group while discovering the most suitable pattern for measurement variance (Asparouhov & Muthén, 2014). This method is applied in study I.

Results

Study I

Rolfe, V. (2021). Tailoring a measurement model of socioeconomic status: Applying the alignment optimization method to 15 years of PISA. *International Journal of Educational Research, 106*, doi: 10.1016 / j.ijer.2020.101723

Socioeconomic status is one of the most important predictors of educational achievement. The PISA survey measures socioeconomic status with ESCS

instruments. ESCS has been criticized in the literature due to poor model adaptation in several countries. Study I used Swedish PISA data to develop a tailored model of socioeconomic status, which can be used across several PISA surveys. The results showed that it is possible to build a measurement model of Socioeconomic status that utilizes the questions that were included in all PISA surveys. A measurement model was designed for PISA 2000, and then tested over the following five PISA surveys (PISA 2003, 2006, 2009 and 2015). Measurement variance was tested with the so-called alignment analysis. The final model showed good model adaptation across all PISA surveys, and it illustrated a new approach for operationalizing socioeconomic status in several time point analyses within an individual country and between different countries.

Study II[1]

Rolfe, V., Strietholt, R., & Yang Hansen, K. (2021). Does inequality in opportunity perpetuate inequality in outcomes? International evidence from four TIMSS cycles, *Studies in Educational Evaluation, 71*. https://doi.org/10.1016/j.stueduc.2021.101086

The literature indicates that the students' socioeconomic background and how much subject content (or Opportunity to learn - OTL) they have significantly affects achievement. The purpose of Study II was to observe socioeconomic inequalities in outcomes and in opportunity to learn, and to investigate whether differences in opportunity to learn mediate differences in outcomes. These socioeconomic inequalities in results and in opportunities are illustrated in a triangular OTL-SES performance model with data from 78 countries, and the study examined the relationship between SES, OTL and performance at four cycles of TIMSS.

The study found that inequalities in mathematics results were almost universal, but inequalities in opportunities were small and rarely significant. The analysis provided little evidence that inequalities in opportunities mediate inequalities in results. Schooling perpetuated socioeconomic inequalities in only a small group of countries. These countries are highly developed and use English as a language of instruction (e.g. England, Scotland, Singapore). In Sweden, the study showed a performance gap at each time point, but inequalities in opportunity were only observed in the 2003 and 2015 cycles. In addition, opportunity to learn only mediated the effect of socioeconomic background on results from the 2003 cycle in Sweden.

Study III

Rolfe, V., Yang Hansen, K., & Strietholt, R. (2020). Integrating educational inequality and educational quality into a model of mathematics performance. [Manuscript submitted for publication]

[1] NB. A revised version of Study II was published subsequent to the publication and defence of this doctoral thesis

The third study focuses on modelling equivalence in the opportunity to learn from a Swedish perspective. As the purpose of the study was to provide context for the understanding of why school results differ between different Swedish schools, Swedish data from year 8 students in TIMSS 2015 are used. The study examines differences between classrooms by integrating teacher characteristics into the triangular SES -OTL performance model.

In the first step, the study examined the difference in teacher quality, performance and opportunity differences between classes with higher or lower socioeconomic composition, and a correlation between teacher quality and teacher specialization. In the second step, the study showed different patterns of inequalities between classes with and without a mathematics-specialized teacher. In both groups of the two-group model, there were large differences in performance, while differences in OTL remain in classes with specialized teachers, but not in classes with non-specialized teachers. Study III emphasizes the importance of high-quality teachers for student achievement.

Discussion and conclusions

The empirical studies in this dissertation show the importance of examining the measurement of inequality-defining concepts. Several approaches to the measurement of SES and OTL are explored in the dissertation. These approaches help build our understanding of both the concepts and benefits of data from international large-scale studies. The results of the dissertation highlight the existence of persistent global socioeconomic inequality in student achievement. The empirical studies do not show that OTL worsens performance gaps, but there is still room to explore this relationship. Finally, the empirical work in this dissertation deepens the understanding of the possibility gap in the Swedish context by showing that inequality patterns vary for specialized and non-specialized teachers.

Unequal opportunities are concentrated in highly developed countries. The great opportunities that exist in English-speaking countries indicate that there may be a distinct cultural norm within the Anglosphere in terms of student background and the implementation of the curriculum. Where there is a significant gap in possibilities, this dissertation suggests that the integration of teaching qualities can explain these inequalities.

References

Aaberge, R., André, C., Boschini, A., Calmfors, L., Gunnarsson, K., Hermansen, M., Langørgen, A., Lindgren, P., Orsetta, C., Pareliussen, J., Robling, P.-O., Roine, J., & Egholt Søgaard, J. (2018). *Nordic Economic Policy Review 2018: Increasing Income Inequality in the Nordics*. Nordisk Ministerråd. https://doi.org/https://doi.org/10.6027/TN2018-519

Arnesen, A. L., & Lundahl, L. (2006). Still social and democratic? Inclusive education policies in the Nordic welfare states. *Scandinavian Journal of Educational Research*, *50*(3), 285-300. https://doi.org/10.1080/00313830600743316

Asparouhov, T., & Muthén, B. O. (2014). Multiple-group factor analysis alignment. *Structural Equation Modeling: A Multidisciplinary Journal*, *21*(4), 495-508. https://doi.org/10.1080/10705511.2014.919210

Baker, D. P., Goesling, B., & LeTendre, G. K. (2002). Socioeconomic status, school quality, and national economic development: A cross-national analysis of the 'Heyneman-Loxley effect' on mathematics and science achievement. *Comparative Education Review*, *46*(3), 291–312. https://doi.org/10.1086/341159

Bevelander, P. (2004). Immigration patterns, economic integration and residential segregation - Sweden in the late 20th century. *Current Themes in IMER Research*, *2*. http://hdl.handle.net/2043/1219

Bobbitt, J. F. (1918). *The curriculum*. Houghton Mifflin Company.

Borelius, U. (2010). Två förorter. *Utbildning & Demokrati*, *19*(1), 11-24.

Bourdieu, P. (1971). Reproduction culturelle et reproduction sociale. *Social Science Information*, *10*(2), 45-79.

Bourdieu, P. (1986). The forms of capital. In J. E. Richardson (Ed.), *Handbook of theory and research in the sociology of education* (pp. 241-258). Greenwood Press.

Bourdieu, P. (1998). *Practical reason: on the theory of action*. Oxford : Polity.

Broer, M., Bai, Y., & Fonseca, F. (2019). *Socioeconomic inequality and educational outcomes: Evidence from twenty years of TIMSS*. Springer International Publishing. https://doi.org/10.1007/978-3-030-11991-1

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). New York ; London : The Guilford Press.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *9*(2), 233-255. https://doi.org/10.1207/S15328007SEM0902_5

Chmielewski, A. K. (2019). The global increase in the socioeconomic achievement gap, 1964 to 2015. *American Sociological Review*, *84*(3), 517-544. https://doi.org/10.1177/0003122419847165

Coleman, J. S. (1990). *Equality and achievement in education*. Westview Press.

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. (1966). *Equality and educational opportunity*. US Congressional Printing Office.

Cowan, C. D., Hauser, R. M., Levin, H. M., Beale Spencer, M., & Chapman, C. (2012). *Improving the measurement of socioeconomic status for the National Assessment of Educational Progress: A theoretical foundation*. https://nces.ed.gov/nationsreportcard/pdf/researchcenter/Socioeconomic_Factors.pdf

Dewey, J. (1902). *The child and the curriculum*. University of Chicago Press.

Duncan, O. D., Featherman, D. L., & Duncan, B. (1972). *Socio-economic background and achievement*. Seminar Press.

Dupriez, V., & Dumay, X. (2006). Inequalities in school systems: effect of school structure or of society structure? *Comparative Education*, *42*(2), 243-260. https://doi.org/10.1080/03050060600628074

Eggen, T. J. H. M., Pelgrum, W. J., & Plomp, T. (1987). The implemented and attained mathematics curriculum: Some results of the second international mathematics study

in The Netherlands. *Studies in Educational Evaluation*, *13*(1), 119-135. https://doi.org/http://dx.doi.org/10.1016/S0191-491X(87)80026-3

Fuchs, T., & Woessmann, L. (2007). What accounts for international differences in student performance? A re-examination using PISA data. *Empirical Economics*, *32*(2), 433-464. https://doi.org/10.1007/s00181-006-0087-0

Gamoran, A., Porter, A. C., Smithson, J., & White, P. A. (1997). Upgrading high school mathematics instruction: Improving learning opportunities for low-achieving, low-income youth. *Educational Evaluation and Policy Analysis*, *19*(4), 325-338. https://doi.org/10.3102/01623737019004325

Goldthorpe, J. H. (1996). Class analysis and the reorientation of class theory: The case of persisting differentials in educational attainment. *The British Journal of Sociology*, *47*(3), 481-505. https://doi.org/10.2307/591365

Gottfried, A. (1985). Measures of socioeconomic status in child development research: Data and recommendations. *Merrill-Palmer Quarterly*, *31*(1), 85–92.

Guillory, J. (2013). *Cultural capital: The problem of literary canon formation*. University of Chicago Press.

Gustafsson, J.-E., & Rosén, M. (2014). Quality and credibility of international studies. In R. Strietholt, W. Bos, J.-E. Gustafsson, & M. Rosén (Eds.), *Educational policy evaluation through international comparative assessments*. Waxmann.

Hauser, R. M. (1994). Measuring socioeconomic status in studies of child development. *Child Development*, *65*(6), 1541–1545.

Holmlund, H., Häggblom, J., Lindahl, E., Martinson, S., Sjögren, A., Vikman, U., & Öckert, B. (2014). *Decentralisering, skolval och fristående skolor: resultat och likvärdighet i svensk skola* (2014: 25). https://www.ifau.se/globalassets/pdf/se/2014/r-2014-25-decentralisering-skolval-och-friskolor.pdf

Houang, R. T., & Schmidt, W. H. (2008). TIMSS international curriculum analysis and measuring educational opportunities. The 3th IEA International Research Conference (IRC 2008),

Hox, J. J., & Bechger, T. M. (2007). An introduction to structural equation modeling. *Family Science Review*, *11*, 354-373.

Hoyle, R. (2012). *Handbook of structural equation modeling*. Guilford Press.

Jencks, C., Smith, M., Acland, H., Bane, M. J., Cohen, D., Gintis, H., Heyns, B., & Michelson, S. (1972). *Inequality: A reassessment of the effects of family and schooling in America*. Basic Books.

Jerrim, J., Volante, L., Klinger, D. A., & Schnepf, S. V. (2019). Socioeconomic inequality and student outcomes across education systems. In L. Volante, S. V. Schnepf, J. Jerrim, & D. A. Klinger (Eds.), *Socioeconomic inequality and student outcomes: Cross-national trends, policies, and practices* (pp. 3-16). Springer

Keeves, J. P. (Ed.). (1992). *The IEA study of science III: Changes in science education and achievement: 1970 to 1984*. Pergamon Press.

Lee, J., Zhang, Y., & Stankov, L. (2019). Predictive validity of SES measures for student achievement. *Educational Assessment*, *24*(4), 305-326.

Lloyd, G. E. R. (1990). *Demystifying mentalities*. Cambridge University Press.

Löfstedt, P. (2019). Socioeconomic inequality and student outcomes in Swedish schools. In *Socioeconomic inequality and student outcomes* (pp. 133-152). Springer.

Lundahl, L. (2016). Equality, inclusion and marketization of Nordic education: Introductory notes. *Research in Comparative and International Education*, *11*(1), 3-12. https://doi.org/10.1177/1745499916631059

Malmberg, B., Nielsen, M. M., Andersson, E., & Haandrikman, K. (2016). *Residential segregation of european and non-european migrants in Sweden: 1990-2012* (2016:1). Stockholm University. http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-137896

Martin, M. O., Mullis, I. V. S., & Hooper, M. (Eds.). (2016). *Methods and procedures in TIMSS 2015*. Boston College, TIMSS & PIRLS International Study Center. http://timss.bc.edu/publications/timss/2015-methods.html.

Marzano, R. J. (2003). *What works in schools. Translating research into action*. Association for Supervision and Curriculum Development.

McDonnell, L. M. (1995). Opportunity to learn as a research concept and a policy instrument. *Educational Evaluation and Policy Analysis*, *17*(3), 305-322. https://doi.org/10.3102/01623737017003305

Millsap, R. E. (2012). *Statistical approaches to measurement invariance*. Routledge.

Möller, Å. (2010). Den "goda" mångfalden. Fabrikation av skolans mångfald i policy och praktik: Diversity as a "good" thing. The fabrication of diversity in educational policy and practice. *Utbildning Och Demokrati*, *19*(1), 85-106.

Mueller, C. W., & Parcel, T. L. (1981). Measures of socioeconomic status: Alternatives and recommendations [Article]. *Child Development*, *52*(1), 13-30. https://doi.org/10.1111/1467-8624.ep8861601

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2016). *TIMSS 2015 international results in mathematics*. Boston College, TIMSS & PIRLS International Study Center. http://timssandpirls.bc.edu/timss2015/international-results/

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2017). *PIRLS 2016 international results in reading*. Boston College, TIMSS & PIRLS International Study Center http://timssandpirls.bc.edu/pirls2016/international-results/

Munck, I., Barber, C., & Torney-Purta, J. (2017). Measurement invariance in comparing attitudes toward immigrants among youth across europe in 1999 and 2009: The alignment method applied to IEA CIVED and ICCS. *Sociological Methods & Research*, *47*(4), 687-728. https://doi.org/10.1177/0049124117729691

Nóvoa, A., & Yariv-Mashal, T. (2003). Comparative research in education: A mode of governance or a historical journey? *Comparative Education*, *39*(4), 423-438. https://doi.org/10.1080/0305006032000162002

OECD. (2014). *PISA 2012 technical report*. OECD Publishing. http://www.oecd.org/pisa/pisaproducts/PISA-2012-technical-report-final.pdf

OECD. (2016). *PISA 2015 results (volume I): Excellence and equity in education*. https://doi.org/10.1787/9789264266490-en.

OECD. (2017). *PISA 2015 technical report*. OECD Publishing. http://www.oecd.org/pisa/sitedocument/PISA-2015-technical-report-final.pdf

OECD. (2019). *PISA 2018 results (volume I): What students know and can do*. OECD Publishing. https://doi.org/10.1787/5f07c754-en

Porter, A. C., & Smithson, J. L. (2001). *Defining, developing, and using curriculum indicators* (CPRE Research Report Series, Issue.

Reeves, E. B. (2012). The effects of opportunity to learn, family socioeconomic status, and friends on the rural math achievement gap in high school. *American Behavioral Scientist*, *56*(7), 887-907. https://doi.org/10.1177/0002764212442357

Rowan, B., Correnti, R., & Miller, R. (2002). *What large scale, survey research tells us about teacher effects on student achievement: Insights from the prospects study of elementary schools*. Consortium for Policy Research in Education.

Scheerens, J., & Bosker, R. J. (1997). *The foundations of educational effectiveness*. Elsevier Science Ltd.

Scheerens, J., Luyten, H., Steen, R., & Luyten-de Thouars, Y. (2007). *Review and meta-analyses of school and teaching effectiveness*. University of Twente, Department of Educational Organisation and Management.

Schmidt, W. H., McKnight, C. C., Houang, R. T., Wang, H. A., Wiley, D. E., Cogan, L. S., & Wolfe, R. G. (2001). *Why schools matter: A cross-national comparison of curriculum and learning*. Jossey-Bass.

Schmidt, W. H., Raizen, S., Britton, E., Bianchi, L., & Wolfe, R. (1997). *Many visions, many aims volume 2: A cross-national investigation of curricular intentions in school Science*. Springer Netherlands: Dordrecht. https://doi.org/10.1007/978-0-306-47208-4

Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, *75*(3), 417-453. https://doi.org/10.3102/00346543075003417

Söderström, M., & Uusitalo, R. (2005). *Vad innebar införandet av fritt skolval i Stockholm för segregeringen i skolan?* (2005:2). https://www.ifau.se/globalassets/pdf/se/2005/r05-02.pdf

Strietholt, R., Gustafsson, J.-E., Hogrebe, N., Rolfe, V., Rosén, M., Steinmann, I., & Yang Hansen, K. (2019). The impact of education policies on socioeconomic inequality in student achievement: A review of comparative studies. In L. Volante, S. V. Schnepf, J. Jerrim, & D. A. Klinger (Eds.), *Socioeconomic inequality and student outcomes: Cross-national trends, policies, and practices* (pp. 17-38). Springer.

Tan, C. Y. (2017). Examining cultural capital and student achievement: Results of a meta-analytic review. *Alberta Journal of Educational Research*, *63*(2), 139-159.

The National Agency for Education. (2005). *The National Agency for Education's situation assessment 2005 [Skolverkets lägesbedömning 2005]*. https://www.skolverket.se/download/18.6bfaca41169863e6a655903/1553958898329/pdf1516.pdf

The National Agency for Education. (2018a). *School size in the academic year 1996/97, independent schools [Skolstorlek läsåret 1996/97, fristående skolor]*. https://www.skolverket.se/skolutveckling/statistik/sok-statistik-om-forskola-skola-och-vuxenutbildning

The National Agency for Education. (2018b). *Students with instruction in mother tongue and Swedish as a second language (SVA) in the academic year 2000/2001 [Elever med undervisning i modersmål och svenska som andraspråk (SVA) läsåret 2000/2001]*. https://www.skolverket.se/skolutveckling/statistik/sok-statistik-om-forskola-skola-och-vuxenutbildning?sok=SokC&omrade=Skolor%20och%20elever&lasar=2000/01&run=1

The National Agency for Education. (2018c). *Teaching in mother tongue and Swedish as a second language [Undervisning i modersmål och svenska som andraspråk]*. https://www.skolverket.se/skolutveckling/statistik/sok-statistik-om-forskola-skola-och-vuxenutbildning?sok=SokC&omrade=Skolor%20och%20elever&lasar=2017/18&run=1

The National Agency for Education. (2020a). *The The National Agency for Education's situation report 2020 [Skolverkets lägesbedömning 2020]*. https://www.skolverket.se/publikationer?id=6436

The National Agency for Education. (2020b). *School units and students in the academic year 2019/20, individual principal [Skolenheter och elever läsåret 2019/20, enskild huvudman]*. https://siris.skolverket.se/siris/sitevision_doc.getFile?p_id=549745

The Swedish Migration Agency. (2018, January 4th 2018). *Overviews and statistics from previous years [Översikter och statistik från tidigare år]*. https://www.migrationsverket.se/Om-Migrationsverket/Statistik/Oversikter-och-statistik-fran-tidigare-ar.html

United Nations. (2015). UN General Assembly, *Transforming our world: the 2030 agenda for sustainable development*, 21 October 2015, A/RES/10/1, https://www.refworld.org/docid/57b6e3e44.html

White, K. R. (1982). The relation between socioeconomic status and academic achievement. *Psychological Bulletin*, *91*(3), 461-481. https://doi.org/10.1037/0033-2909.91.3.461

Yang Hansen, K., & Gustafsson, J.-E. (2016). Causes of educational segregation in Sweden – school choice or residential segregation. *Educational Research and Evaluation*, *22*(1-2), 23-44. https://doi.org/10.1080/13803611.2016.1178589