JOUNI VÄLIJÄRVI AND SARI SULKUNEN

1. FINNISH SCHOOL IN INTERNATIONAL COMPARISON

ABSTRACT

Traditionally, one of the strengths of the Finnish education system has been students' advanced reading literacy skills. In PISA assessments, the proficiency levels for mathematics and science have also been high in Finland. Albeit the average level of Finnish student performance has slightly declined in the latest PISA assessments, Finland is still among the highest-ranking countries in the world. The variation between individual students and between schools, in particular, has remained below the international average. The Finnish school system provides highly equal educational opportunities irrespective of the students' socio-economic background and place of residence. In Finland the correlations between students' engagement, self efficacy and reading habits with their cognitive outcomes are higher than in any other country. Their reading habits have changed rapidly in recent years, however, which indicates the deep impact of the new media on students' attitudes, motivation and behaviour at school. This challenges schools to reform their instructional practices to raise the level of cognitive performance. The national curriculum reform is promoting necessary changes on both the national and individual school level. Also new projects to reshape teachers' professional development and to promote the use of digital learning environments at school have been launched.

Keywords: evaluation, learning outcomes, education system, education policy

INTRODUCTION

Finnish students are doing very well when their learning outcomes in reading, mathematics and science are compared to student performance in other countries. In international rankings based on PISA studies, for instance, Finland is still among the top countries in the world. In Europe, Finland is number one in reading and science and among the best performing countries in mathematics, along with Switzerland, the Netherlands, Estonia, Poland, and Germany. However, the latest results from PISA 2012 give rise to some concern about the future of Finnish basic education. The average trend in all three domains has been declining since 2009, and also the variation among students has slightly increased. New political and developmental measures are needed to guarantee high quality education for future student generations.

H. Niemi et al. (Eds.), Miracle of Education, 3–21.

In this chapter we will discuss the strengths and challenges of the Finnish education system. This chapter demonstrates how international comparative studies can be utilised for identifying needs for national development. Although the PISA assessments still demonstrate the high quality of Finnish education, the results also show that some other countries, like Poland, Germany and Korea, have been more successful in finding new solutions to raise the proficiency levels of their students. PISA has been a powerful tool for them to proceed effectively in their developmental measures. As an international, independent, and collaborative programme, PISA has also managed to convince national policymakers about the need for reforms more effectively than assessments conducted only on the national level. Deeper analyses of the PISA datasets allow countries to learn from each other, even though it is not reasonable to try to copy structures and practices from one country to another as such. In Finland, as in many other countries, national education evaluation policy is now more clearly focused on enhancement and improvement than it had been in previous years. In this chapter our aim is to present how international comparative studies can help recognise and understand the strengths and weaknesses of the Finnish education system, and how these factors are changing as a function of time and societal change. At the end of the chapter we will discuss the political and developmental measures carried out in Finland to address these changes, e.g. by investing in reforms of the national curriculum, teachers' professional development, and the digitalisation of schools.

AMONG THE TOP-RANKING COUNTRIES IN THE 2000s

PISA assessments on the outcomes of school systems and related factors have been carried out in three-year intervals since the year 2000. In turn, each of the three domains – reading literacy, mathematics, and science – is the main assessment domain for one particular round: In 2000 and 2009, the main domain was reading literacy, in 2003 and 2012, it was mathematics, and in 2006 and most recently in 2015, the main focus was on science. Comparisons for result trends can be made most extensively between the test rounds having the same main assessment domain. Also the background data gathered follows this domain rotation. In each round, the two minor domains provide mainly trend information about the development of results in these areas.

Since the inception of PISA assessments, Finnish students have performed very well. In the first four rounds, Finland was the best country in the overall ranking. In 2009, however, Shanghai scored better than Finland, but those results do not represent the entire national Chinese educational system. In these rankings the order of countries has varied in different assessment domains. Finland has been particularly strong in science and reading literacy, but has also been among the top countries in mathematics. In PISA 2012, Finland's position relative to other countries weakened, while the national average level declined in all three domains. Although Finland was still among the high-performing countries, in many other, mainly Asian,

countries the students clearly did better than their peers in Finland. The strongest decline was found in mathematics (OECD, 2001, 2004, 2013a,b; Välijärvi, 2014). Figure 1 shows how Finnish students' performance improved between PISA 2000 and 2006. Especially their science literacy scores rose remarkably. Finland's lead in the ranking was clearest in 2006, when science was the main assessment domain.[1]

The excellent performance of Finnish students in PISA tests, especially for science and mathematics, came as quite a surprise to the Finnish people. In TIMSS assessments prior to PISA, Finland had reached a performance level only a little above the international average. One suggested explanation for this difference in results is the fact that these two research programmes differ from each other in terms of their objectives. The functional approach represented by PISA, which emphasises students' capability to apply their skills and knowledge in various problem-solving situations, is well in line with the Finnish curricular reforms for mathematics and science carried out in the 1990s. At that time attempts were also made to reform mathematics and science instruction through national experiments and teachers' in-service training, which involved a large number of schools and teachers (Arffman & Nissinen, 2015).

The year 2009 was a clear turning point in Finnish students' PISA performance. In 2012 the negative trend continued and took an even steeper downward curve. Figure 1 indicates that Finnish students' average reading literacy level in 2012 was lower than in 2000, and the difference was equivalent to more than half a year of schooling. The decline in mathematics performance from 2003 to 2012 was equal to the reading literacy decline. Also in science the decline can be estimated to be within a similar range.

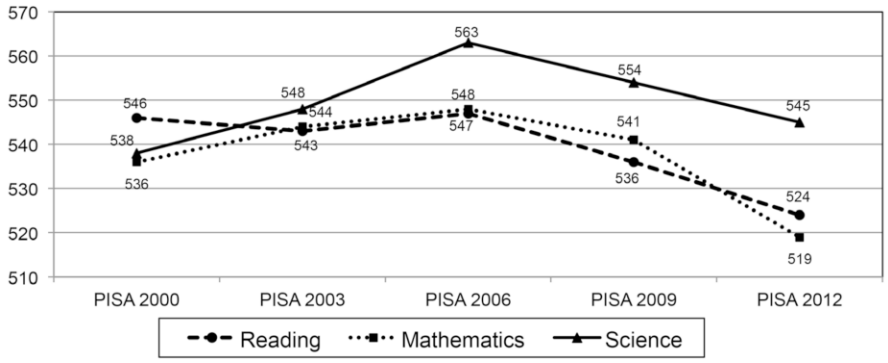

Figure 1. Averages of the PISA-domains in Finland 2000–2012

At the same time many other high-performing countries have managed to maintain their performance level or even improve it. Nonetheless, in international comparison Finland is still fairly highly ranked. In the PISA 2012 reading literacy results, Finland

was sixth among the 65 participating countries (real position 6–12, accounting for random error due to sampling), and, together with Ireland, was the best among European countries. Correspondingly, in mathematics Finland's position was 12th (10–17). In science the Finnish students reached as high as fifth place (4–7), and were the best compared to other European countries. Comparison of placements in rankings across different PISA rounds is not straightforward, however, as the number of participating countries and regions has been increasing significantly from PISA 2000 to PISA 2012. New countries and regions have come along, some of which have excellent test results. For instance, of the top-ranking countries/regions of PISA 2012, Shanghai, Singapore, Chinese Taipei, and Estonia had not yet participated in 2000 and 2003 (OECD, 2013a; Kupari et al., 2013; Välijärvi et al., 2015).

In addition to the three above-mentioned domains, PISA also assessed students' general problem-solving skills in 2003 and 2012. In 2003 Finland came in third (1–4) with a national average score of 548 points. In 2012, when the problem-solving test was administered completely as a computer-based assessment, the Finnish national average was 523 points, which gave Finland tenth place (8–11). Both times, the OECD average was set to equate to 500 points.

INDIVIDUAL VARIATION IN STUDENT PERFORMANCE

Finnish student performance has been characterised by a narrow range of variation between high- and low-achieving students when compared to other countries. This means greater educational equality between individual students. Greater equality has been the prime objective in Finnish school reforms since the 1960s. In light of the PISA results Finland has been quite successful in striving for this objective. However, the situation seems to be changing.

Indicating the variation among student performances, the standard deviation for Finland stayed clearly below the average levels of OECD countries until PISA 2009 (Figure 2). In many cases Finland has been the country with the smallest standard deviation, typically only about 80–85 per cent of the OECD average.

In 2012, the variation in Finnish student performance was larger than in any of the previous PISA assessments, whereas in the OECD countries on average, this variation has clearly decreased. In mathematics and reading literacy, the OECD averages for standard deviation decreased prior to PISA 2012, and they decreased in science in PISA 2012. Hence, now that the Finnish school system no longer shows distinctively smaller variations in student performance, but shows SD figures close to the OECD average, there is no evidence for greater educational equality in this respect, either. This trend raises concern (Arffman & Nissinen, 2015; Välijärvi et al., 2015).

Above we have dealt with student performance on average and also in terms of between-student variation. Next, we will take a closer look at how this student performance is distributed across different proficiency levels (OECD, 2013a).

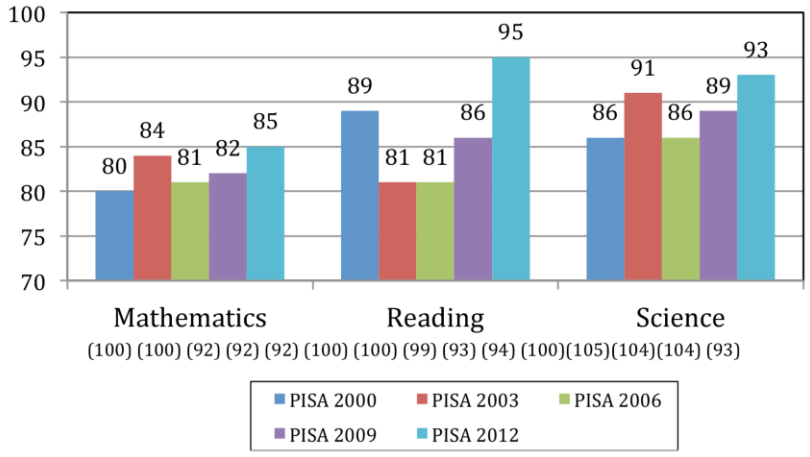

Figure 2. Standard deviations for different domains in Finland (OECD average SDs in brackets)

In PISA 2000, student performance in reading literacy was divided into five proficiency levels. Some students remained below the lowest defined proficiency level. Since 2009, reading literacy levels have been subdivided into more refined grading categories. Level 1 (lowest) and Level 5 (highest) were both divided into two separate parts. In the next comparisons these have been reintegrated, however, also for PISA 2009, in order to enable straight comparison of the distributions from different test rounds.

According to the PISA definition, students placed at Level 1 or below can be regarded as poor readers. These students are quite likely to face serious problems with various types of reading required in modern working life or in further studies, for example. Their reading literacy skills are also less than adequate for ordinary civic life in terms of utilising text-based media, for instance. Research has shown that in such cases there is also a big risk of social marginalisation (OECD, 2010c, 2013a; Linnakylä et al., 2004).

In Finland, the percentage of poor readers increased from 6.9% in PISA 2000 to 8.1% in PISA 2009. The change is not very big, but means that in 2009 there were about 750 more poor readers in this year's class than in 2000. Nonetheless, the percentage was still small in comparison to other countries. Within the same period, the OECD average percentage of poor readers increased from 17.9% to 18.8%.

In Finland the percentage of students leaving compulsory education with inadequate reading literacy skills is still relatively small in international comparison, actually one of the smallest. One particular reason for concern is that in the light of recent PISA assessments the percentage of these students seems to be increasing further. However, as PISA 2012 data for this domain is fairly limited in scope, it is

too early to say anything absolutely certain about the continuation of the negative trend.

During the same period the percentage of excellent readers (Level 5) has decreased at a worrying rate in Finland. Although their percentage (14.5%) was internationally still one of the highest in 2009, it had dropped by four percentage points within a decade. This decline was one of the biggest among the participating countries. Considering the overall competence pool of the nation, the change is alarming. A corresponding undesirable trend took place at the same time in many other OECD countries as well. While in PISA 2000 almost ten per cent of students within OECD countries reached Level 5 in reading literacy, in PISA 2009 their percentage was only 7.6%.

A similar negative trend in student performance as in reading literacy can also be seen in mathematics. The assessments in focus are PISA 2003 and PISA 2012, in which mathematics was the main assessment domain (Figure 3).

During this period the percentage of students performing poorly in mathematics (below Level 2) was doubled in Finland from six to twelve per cent. Correspondingly, the percentage of high-achievers (Levels 5 and 6) decreased to 16 per cent, while in 2003 it had been nearly 25 per cent of the age group. From the viewpoint of developing the nation's educational capital this trend is alarming.

In comparison to OECD countries in general, the situation in Finland is still reasonably good for mathematical literacy. The percentage of poorly performing students in OECD countries is still over 20 per cent of the age group. In PISA 2012 only 12% of the students reached Level 5 or 6 in mathematics, while in 2003 this percentage was 15%.

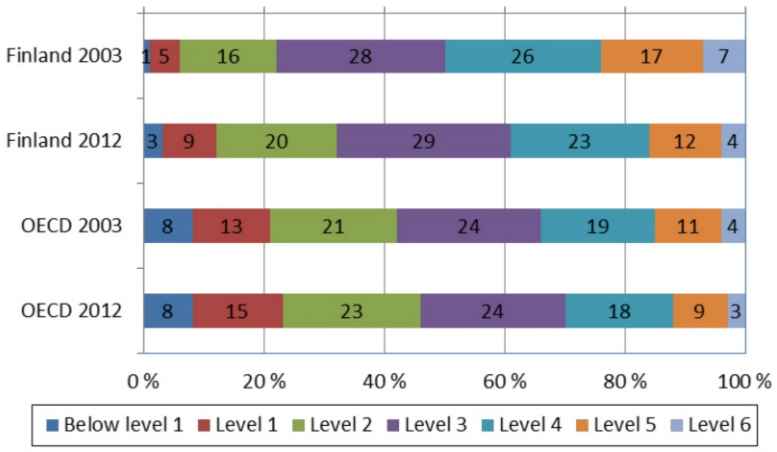

Figure 3. Percentage of students at each proficiency level in mathematics in 2003 and 2012

Results Trends for Different Levels of Achievement

Educational equality in terms of learning outcomes can also be examined through test score percentiles. Percentile refers to a threshold value in the distribution of students' test scores, below which a specific percentage of students remain as indicated by the particular percentile. For example, the tenth percentile is the score value below which remain 10% of students in PISA tests, while 90% reach beyond this limit. Correspondingly, the 75th percentile is the score value that defines the cut between the highest performing quarter of students and the lower three quarters. It can be said that the closer the scores of the highest and lowest percentiles are to each other, the better the equality among students in terms of learning outcomes. Percentiles can also be used in investigating how this kind of equality has developed over time, i.e. whether the difference between the highest and lowest percentiles has increased or decreased.

Table 1 shows that from PISA 2000 to PISA 2009, the biggest decline in the percentiles for reading literacy (the main assessment domain in these years) in Finland was found among the best-performing students. In 2009 the placement to the top five per cent called for a test score that was 15 points lower than in PISA 2000. Also the score level of low-achievers was lower in 2009 than in 2000, even though the difference in percentiles was smaller than among the high-achievers; 8 score points for the 5th percentile and 10 score points for the 10th percentile.

In mathematics the decline from PISA 2003 to PISA 2012 (mathematics as the main assessment domain) was similar but clearly steeper than the decline in reading literacy performance. This concerns the high-achievers, in particular. In the Finnish PISA 2012 data a student reached the top ten per cent with a test score that was 29 points lower than that required in PISA 2003; and for the top five percent the

Table 1. Percentiles in reading and in mathematics in Finland

	PERCENTILE					
	5th	10th	25th	75th	90th	95th
READING						
PISA 2000	390	429	492	608	654	681
PISA 2009	382	419	481	597	642	666
Change 2000–2009	*–8*	*–10*	*–11*	*–11*	*–12*	*–15*
MATHEMATICS						
PISA 2003	386	421	477	602	658	690
PISA 2012	376	409	463	577	629	657
Change 2003–2012	*–10*	*–12*	*–14*	*–25*	*–29*	*–33*

threshold value fell by 33 score points. Translated into school years this would mean that in Finland the top-performing students in mathematics were almost one year behind the level of their peers in PISA 2003. This gap is considerable and will inevitably influence the level from which further studies, especially in mathematics, can start in secondary and higher education (OECD, 2013a; Välijärvi et al., 2015).

Also at the low-achieving end in the mathematics tests the decline was evident, although clearly smaller than among the top performers. At the lower end the trend was quite similar in mathematics and reading literacy scores.

Gender Differences in Student Performance

The difference between girls and boys in PISA reading literacy tests has always been exceptionally large in Finland in comparison to other OECD countries. In different PISA assessments, the difference in favour of girls has varied from 44 to 62 score points (Figure 4), while in OECD countries on average it has varied from 31 to 38 score points. Finland's gender differences in reading literacy performance have been the largest or one of the largest in the OECD throughout the PISA programme. Despite many national measures to promote the equality of genders, this gap appears to be growing rather than diminishing in Finland (OECD, 2013b).

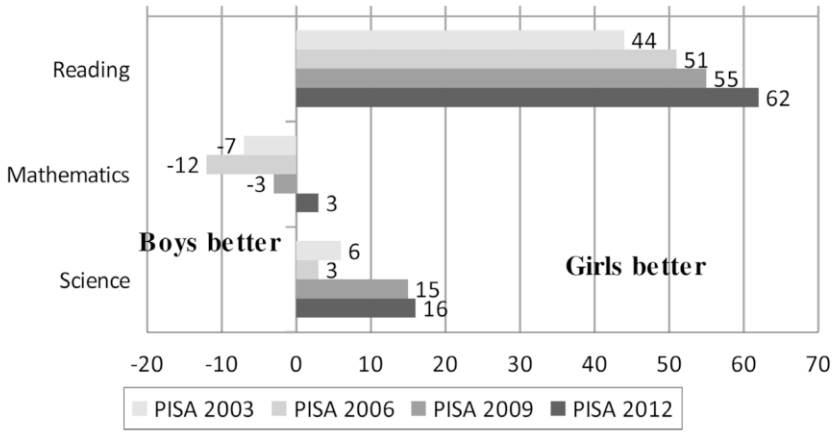

Figure 4. Gender gap in Finland

The differentiation of genders in terms of test achievement is even more striking when it comes to girls' and boys' distribution across the different performance levels of reading literacy. Among boys the risk of poor reading skills has clearly grown more than among girls.

In PISA 2000 only 4% of girls but 11% of boys were on Level 1 or below in reading literacy. In 2009, 13% of boys belonged to this risk group and in 2012 this percentage was as high as 18%. The last percentage figure should be considered with slight reservation, however, as it is based on a much more limited array of test items than the PISA 2000 and 2009 assessments. Anyway, it seems that among boys the share of poor readers has been clearly increasing, while among girls the percentage of poor readers has remained almost unchanged. Thus, according to the PISA 2012 results, the likelihood of boys being poor readers is nearly four times greater than that of girls. Different levels of basic reading literacy skills will inevitably influence boys' and girls' engagement and success in post-compulsory education. It would be important to investigate by follow-up studies, for example, how strongly deficiencies in reading literacy skills at the end of compulsory school predict drop-out in secondary education.

Among girls, the largest change is seen in the percentage of excellent readers (Level 5). While in PISA 2000 more than a quarter (26%) of Finnish girls reached this performance level in reading literacy, in 2009 their share decreased to 21%. In PISA 2012 the percentage of excellent readers among girls seems to have stayed pretty much the same. Among boys the percentage of excellent readers has been diminishing; from 11% in PISA 2000 to 8% in 2009 and further to 7% in 2012. Hence, the future competence potential generated by the group of top performers seems to have decreased significantly during the first decade of this century. Reading performance has remained relatively stable since 2000 among girls who come from families with the highest level of cultural capital (ie. classical literature, art) and the highest number of books. Among boys with a similar family background, reading performance has decreased but the decline has been subtle. However, the decrease has been substantial with both girls and boys coming from culturally disadvantaged families. In the disadvantaged groups, the decline in the average reading score has been particularly pronounced among boys (Chiu, 2006; Arffman & Nissinen, 2015).

Finnish students' exceptional gender-based differences are not limited to reading. In mathematics and science, the difference between the boys' performance in comparison to the girls is lower in Finland than in OECD countries on average (Figure 4). This characteristic was further highlighted in PISA 2012. This was the first time when Finnish girls outperformed boys in mathematics, although only by a slight difference of three score points. In all previous PISA mathematics assessments the difference has been in favour of boys, most clearly in PISA 2006, where the gap was 15 score points. In the PISA 2012 mathematics test, in OECD countries on average, boys scored 11 points higher than girls. As for science, Finnish boys were clearly (16 points) behind girls in PISA 2012 test scores, whereas in OECD countries on average, boys performed on level with or slightly better than girls in each assessment. Overall in PISA 2012 the difference was only one score point in favour of boys (Kupari et al., 2013).

Another characteristic of gender differences in student performance in all three assessment domains is that the variation of test scores is greater among boys. This difference has been observed in each PISA round. In Finland, the standard deviation of girls' test scores in reading literacy has ranged from 73 to 85 score points, and for boys correspondingly from 81 to 94 score points. In mathematics these figures have ranged from 78 to 81 score points for girls and from 81 to 89 score points for boys. In science performance the standard deviations have usually been somewhat higher for both genders than in mathematics or reading literacy: for girls this range is 82 to 88 score points and for boys 90 to 97 score points.

In comparison to boys in other countries, the Finnish boys' standard has been good, however, and in many parts even excellent, especially in science (OECD, 2013b). Nonetheless, in the most recent PISA assessments the performance of Finnish boys' has clearly declined more than that of Finnish girls, and the rankings of Finnish boys in international comparisons have also declined more significantly than Finnish girls. Gender differences in achievement have implications for seeking to further one's studies and for access to secondary and higher education, for example.

The Connections of Students' Socioeconomic Background to Their Performance

In PISA, the connection of students' socioeconomic background to their performance has been one of the main areas of interest. It has always been a key issue of Finnish education policy as well. In Finland, as in many other countries, one of the core objectives of basic education is to minimise the negative effects of the family's social and economic circumstances on learning outcomes.

The PISA student's socioeconomic background indicator consists of four types of variables: (1) family wealth, (2) parents' occupations, (3) parents' education, and (4) home cultural capital. These variables are compiled into a single index.

In all PISA countries, the students' socioeconomic background has an effect on student performance. Figure 5 illustrates this connection in mathematics performance in Finland and in all OECD countries in PISA 2003 and 2012. In the Finnish data for PISA 2003, the students belonging to the highest socioeconomic quarter based on their home background outperformed the lowest quarter by 61 score points on average, which is the equivalent of being about one and a half school years ahead. This difference can be interpreted as added value, which is produced by the parents' higher educational level, occupational and economic status as well as the cultural capital of the home, and enjoyed by the students in the highest socioeconomic group. In comparison to the OECD average difference between the highest and lowest socioeconomic groups in the PISA 2003 mathematics test (93 score points), the effect of this background factor was clearly lower in Finland (OECD, 2013).

In PISA 2012 the difference between the highest and lowest quarters in Finland was 67 score points, which was slightly more than in 2003. Hence, the effect of students' background on their mathematics performance increased to some degree in this period. In contrast, in OECD countries on average the difference between

the highest and lowest socioeconomic groups were slightly decreasing (by 3 score points), although remaining clearly larger than in Finland in PISA 2012. Thus, while in Finland educational equality relative to student's socioeconomic background did decrease to some extent, it was still on a higher level than in OECD countries on average (OECD, 2013b).

Between-School Differences

In Finland, the differences between school-specific results have remained small during the whole PISA programme in comparison to the between-school variations in other countries. In this respect, Finnish national variations have usually been the smallest or second smallest of all PISA countries in all three assessment domains.

In Finland, the between-school variation in the PISA 2012 mathematics test scores was only 6% of the total variation. The between-school variation was small also in other Nordic countries. This result indicates a great deal about the comprehensive school system pertinent to the Nordic countries. A core objective of these systems is to guarantee equally high-quality instruction for all students irrespective of the particular school (OECD, 2010b). Large between-school variations were found in Chinese Taipei, the Netherlands, Hungary, Belgium, Germany, and also in Shanghai.

In most Asian countries (and regions) schools differed greatly from each other in terms of their PISA 2012 results, where the main assessment domain was mathematics. In PISA 2009, however, the between-school variations in these countries in reading literacy performance were considerably lower.

In Finland, the between-school variation in PISA results has remained at a low level irrespective of the assessment domain. In 2009, when reading literacy was the main assessment domain, the school-based variation was 8% of the total variation, i.e. a little greater than in PISA 2012. On the other hand, compared to PISA 2003 with mathematics as the main domain, the between-school variation was about two percentage points higher. Although this change is not statistically significant, it is worth noting.

Student Attitudes and Time Spent on Reading

One of the strongest factors explaining PISA reading literacy proficiency is the amount of time spent on reading outside of school (engagement in reading). The amount varies among the Finnish students to a large extent. There are also large gender differences in this respect. Moreover, the time-spending profile of adolescents changed considerably from the year 2000 to 2009. The change occurring in engagement in reading explains, to a notable degree, the decline in PISA reading literacy performance (OECD, 2010d, 2013a; Arffman & Nissinen, 2015).

Still in PISA 2000, only slightly more than a fifth of Finnish students reported that they did not read at all in their free time, while nearly one half read for pleasure

for at least an hour a day. Nine years later the share of students reporting no reading engagement outside of school hours had increased up to a third, which meant an increase of 50%. Correspondingly, the share of those spending nearly an hour a day in free-time reading diminished to roughly a third of all students.

This is a dramatic change when compared to other OECD countries. Students' free-time reading has been decreasing in the 2000s in all developed countries, but much more moderately than in Finland. In 2000 Finland was distinguished as a country of keen young readers, however, by 2009, Finnish adolescents' time-spending profile was already close to the OECD average. In PISA 2000 the OECD average percentage of students reporting no free-time reading activity at all was 10 percentage points higher than in Finland. In PISA 2009 this difference was only 4 percentage points. Correspondingly, the notable decrease in the percentage of keen readers (reading for fun more than an hour a day) in Finland brought them down to the level of the OECD average (OECD, 2010d; Välijärvi, 2014).

There is a considerable gender gap in reading for fun. In PISA 2009 nearly half (47%) of the Finnish boys reported that they were not reading at all in their free time. In PISA 2000 the percentage of such boys had been clearly lower, about a third (35%). For girls the corresponding percentages were 19% in PISA 2009 and 10% in PISA 2000, which means that the proportion almost doubled within nine years.

According to the PISA 2009 data, Finnish boys' free-time reading activity was very close to the OECD average (48% did not read for fun), whereas the percentage of non-reading Finnish girls (19%) was clearly below the OECD average (27%). Overall, in comparison to PISA 2000 statistics, the percentages of non-readers increased strongly among both genders in Finland. The respective OECD averages increased as well, but more moderately (for girls 23% -> 27% and for boys 40% -> 47%).

Besides gender, also socioeconomic background is strongly associated with the reading activity trends (Figure 5). When students are divided into four equally sized groups based on their socioeconomic status, in PISA 2000 over 90% of girls in the highest group reported that they read for fun at least sometimes. In PISA 2009 this figure was 5 percentage points lower. By the same token, in PISA 2000, 86% of girls in the lowest socioeconomic group reported some reading for fun, whereas in PISA 2009 this share had decreased by as much as 11 percentage points, which means that the decrease was more than twice as large as the one evidenced among girls in the highest socioeconomic group (Välijärvi, 2014).

Correspondingly, in PISA 2009, 64% of boys in the highest socioeconomic group (quarter) reported that they were reading for fun for at least half an hour on a daily basis, which was 8 percentage points lower than in PISA 2000. Among boys in the lowest quarter, this share decreased by 19 percentage points; declining from nearly two-thirds in PISA 2000 to less than a half in PISA 2009.

The relatively greater rate of rejecting reading activities among boys, and especially among students in the lowest socioeconomic group, largely explains the fact that in Finland the overall PISA reading literacy scores have been decreasing, while the

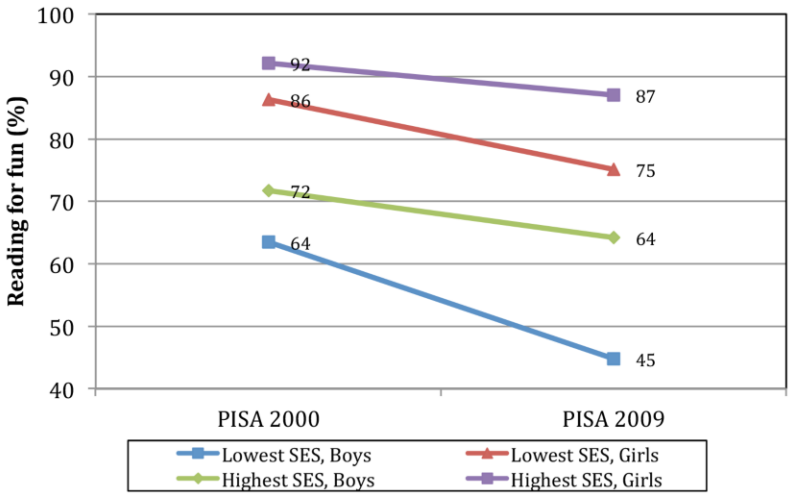

Figure 5. Reading for fun by gender and socio-economic status (SES)

gender gap as well as the impact of home background on student performance in reading literacy have been increasing. The association between decreasing reading activity and socioeconomic background is also reflected in the performance results which show that the decrease in reading performance is pronounced among students from culturally disadvantaged families (Arffman & Nissinen, 2015).

Diversity of Reading and Interest in Reading Activities

According to PISA data, Finnish students did less reading in most forms of print media in 2009 than in 2000. Girls' and boys' reading profiles have always been different in many respects. According to the PISA 2009 data, even though the frequency of reading newspapers was fairly similar for both genders, two-thirds of girls read magazines at least a few times a month, whereas only slightly over half of boys did so. For comics, it was the other way around. Among regular readers of fiction, girls are clearly in the majority with the ratio of three girls to one boy, while non-fiction books are somewhat more popular among boys than among girls.

An index indicating the diversity of reading has been developed based on the above-mentioned genres and related frequencies of reading. The OECD average of the index was set to 0 with a standard deviation of 1. In terms of the diversity of student reading, Finland is one of the top countries within the OECD, even though the diversity has diminished (Figure 6). According to the PISA 2000 data, Finnish girls' reading activities were clearly more diverse (0.70) than those of boys (0.51). In comparison to the OECD average, the diversity of reading was very high in both groups. In PISA 2009, the gender gap for the diversity of reading remained similar

in Finland. Although these index values decreased equally for boys (0.36) and girls (0.55), they were still very high in international comparison (OECD, 2010a,c).

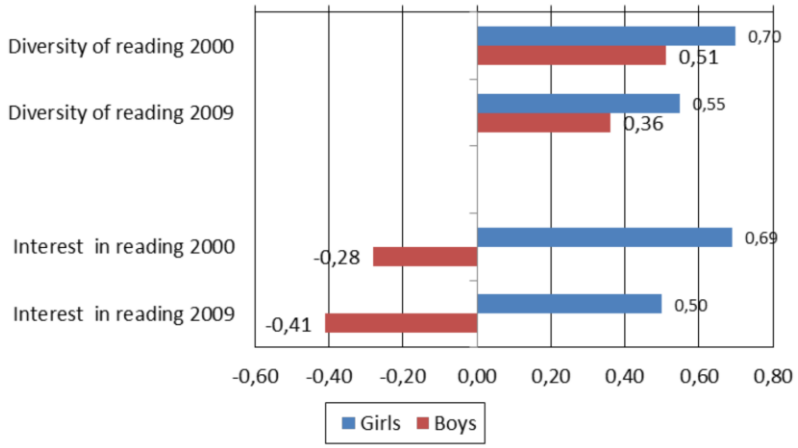

Figure 6. Diversity and interest in reading among boys and girls in PISA 2000 and 2009

Figure 6 also shows that Finnish students' interest in reading clearly decreased since PISA 2000, and for both genders. The difference in interest between boys and girls has remained very large. In PISA 2000 Finnish girls' interest in reading (0.69) was exceptionally high compared to girls across all OECD countries (0.33) and especially to boys. In PISA 2009 the difference was considerably smaller, although Finnish girls' interest in reading was still on a high level (0.50) in comparison to the OECD average for girls (0.32). In PISA 2000 Finnish boys were roughly on level with the OECD average (–0.24 vs. –0.23) in this respect, but in PISA 2009 their rating fell down to –0.41. Hence, within nine years interest in reading declined in Finland for both genders, more than in almost any other OECD country.

In Finland the connection between student's interest and observed reading literacy levels has been exceptionally strong compared to other advanced school systems (OECD, 2010d, 2013a). The same applies to the correlation between diversity of reading and reading literacy performance, even though it is weaker than the connection with interest. When students are divided into four equally sized groups based on the reading interest index, the most interested quarter group in PISA 2009 scored about 121 points higher on average than the students in the least interested quarter. This difference equals approximately three school years. The difference between these groups had increased by 10 score points since PISA 2000, and was clearly above the OECD average (103 score points). In the PISA 2009 data for Finland, the reading interest index alone explained as much as 27% of the total variation in reading literacy scores, which was the highest percentage among OECD countries. The corresponding OECD average was 18.1%.

In the PISA 2009 reading literacy assessment, students in the highest quarter in terms of their reading diversity index outperformed their peers in the lowest quarter by 81 score points on average, which means a difference of about two school years. In PISA 2000 the difference was almost identical. The OECD average for the difference between these student groups in PISA 2009 was 55 score points. Statistically this index alone explained 13.7% of the total variation in PISA 2009 reading literacy test scores in Finland (the highest percentage within OECD countries), while the OECD average for the explanatory power of this index was only 5.9%.

CONCLUSIONS

In this chapter, the analysis of PISA results and trends in Finland is focused particularly on the weaknesses and concerns shown by the results. This approach is useful for determining the most important issues for improving education. Even though Finland is still in many respects one of the top achieving countries, along with some Asian countries, trend analyses are crucial for the continuous development of education.

The decreasing trend in average performance and the increasing number of low-performers have gained wide attention in the educational field in Finland, and rightly so. Moreover, it is evident that educational equality and equity, which have been – and still are – at the heart of educational policy in Finland, show disconcerting deterioration as the gender gap is widening and the impact of home background on students' reading literacy performance has increased. Particularly students from culturally disadvantaged homes are at risk and show relatively steep decreases in both reading engagement and performance. These trends show that the Finnish schools have difficulties in supporting students' growth and development of key competencies in the current context, where technologies related to literacy, textual landscapes and literacy practices are changing constantly (Leu et al., 2013, pp. 1158–1162), as are students' immediate environments, needs, and interests. Moreover, the Finnish schools are no longer able to overcome the effects of family background on learning outcomes to the same extent as before. The increasing number of immigrant students makes this issue even more challenging (Harju-Luukkainen et al., 2014). Thus, we need to find new pedagogical ways to promote the development of students' reading and mathematical literacy (including digital literacy) and also to support the growing number of low-performing students who do not necessarily receive adequate support from home.

DISCUSSION

Education is highly regarded in Finnish society, and the present Finnish government also has guidelines for education on its agenda. The government emphasises not only the role of new learning environments and digitalisation in pedagogy, but also motivational support for students, as a means to improve learning outcomes.

One goal set by the government is for Finland to be the leading country in modern education (Finnish Government, 2015, 15). This implies and requires continuous educational development for which international assessments of learning outcomes, such as PISA, provide valuable information.

Based on the most recent results in PISA and other assessments, several measures and national programmes have been launched to turn the negative trend around and update Finnish education for the 21st century. The Finnish National Core Curriculum for Basic Education was recently revised following the usual 10-year cycle. The curriculum emphasises new pedagogical culture in which learning is a holistic process in which different school subjects are not only taught separately but also integrated into a meaningful and coherent whole and in which students will have ownership and an active role in their learning (Finnish National Board of Education, 2014). As a response to the declining reading literacy performance in both PISA and national assessments (e.g. Harjunen & Rautopuro, 2015), multiliteracy was introduced in the new curriculum as one of the cross-curricular competencies for all school subjects. This will broaden the concept of texts in all subjects, and thus integrate digital texts into instruction, and explicitly introduce literacy as a topic for the whole curriculum, making teaching of (disciplinary) literacy skills a responsibility of all teachers in all subjects.

In addition, the Finnish Ministry of Education and Culture launched a national development programme called *Basic education of the future – Let's turn the trend!* The overall aim of the project was to provide an analysis and recommendations for updating Finnish basic education. Based on a research review, the educational experts produced a report describing the current status of basic education and the reasons for the deteriorating learning outcomes. The report (Ministry of Education and Culture, 2015) included several development proposals for basic education, and underlined the need to develop a new pedagogical culture to support, on the one hand, collaborative learning and, on the other hand, individual learning where students have an opportunity for "voice and choice" (Harinen et al., 2015, 75). It further emphasised that digital technology offers many possibilities that have not yet reached their full potential in education in Finland. To some degree, the proposed changes in education have already been realised in the new curriculum. As suggested also in the *Basic education of the future* report (Jordman et al., 2015, 81), the success of the intended new curriculum relies on implementation which now requires systematic professional development for teachers (Silander & Välijärvi, 2013).

In order to disseminate innovative practices among schools, the Finnish National Board of Education coordinates the school network for educational development (Finnish National Board of Education, 2015). The schools of the network are in the frontier of educational development in Finland, as the purpose is to create and disseminate pedagogical innovations, to promote learning motivation and school enjoyment, and also to support teachers' professional development. For this work,

the network provides a structure for collaborative learning and cooperation. Many of the areas for development relate to the use of ICT in education and teachers' professional development.

In addition to the development related to the whole education system, there are also domain specific interventions. There have been several national efforts, for instance, to digitalise education, starting from the cross-curricular topic of ICT use in the new national curriculum (Finnish National Board of Education, 2014, 21) to the targeted state grants for the development of digital services and materials as well as for teachers' professional development. Additionally, the Ministry of Education and Culture is financing EduCloud service (www.educloudalliance.org), which aims at supporting teachers and students in using digital learning resources. Through the EduCloud platform, teachers and students can get easy access to learning materials, pedagogical games, applications and services (ECA, 2015).

In response to the decrease in learning outcomes and motivation to learn, the Ministry of Education and Culture has launched two national programmes. Lukuinto (Joy of reading) was launched in 2012 to strengthen the literacy skills of 6–16-year-olds and increase their reading engagement. A special target group for this was boys, who are overrepresented among the low performers (Lukuinto, 2015; Ministry of Education and Culture, 2012). The programme emphasises the collaboration between schools and libraries. Also the learning of mathematics and science has been addressed by a national programme (Ministry of Education and Culture, 2014). In this programme also, the target group consists of 6–16-year-old students and their teachers. The programme aims at finding innovative teaching and learning methods and learning environments for mathematics and science education.

It is evident that many efforts to improve the Finnish education system have been directed specifically to basic education, which is the stepping stone for students' future educational choices and careers. This illustrates the dedication with which Finns approach the development of the comprehensive school, and similar approaches can be seen at other education levels as well. Basic education is a natural place to start as it covers the whole age group. The extent and nature of the proposed changes reflect the determination to develop education and stop the declining trend rather than the dramatic nature of the decline itself.

NOTE

[1] In PISA, the national test scores have been standardised so that the OECD average in PISA 2000 was 500 score points for all three domains and the respective standard deviation was 100 score points. In subsequent PISA assessments the scores are standardised similarly so that the results from different years are comparable both across and within individual countries. Roughly speaking, in Finland a difference of a little less than 40 score points on the PISA scale is estimated to correspond to proficiency development occurring during a school year; in other words, if the difference between two students or student groups is 60 points on the reading literacy scale, for instance, it is roughly equivalent to one and a half years of schooling. The same applies to mathematics and science as well.

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