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# Findings from the ÉpStan National Education Monitoring against the Background of the COVID-19 Pandemic

Antoine Fischbach, Joanne Colling, Jessica Levy, Ineke M. Pit-ten Cate, Cassie Rosa, Charlotte Krämer, Ulrich Keller, Sylvie Gamo, Caroline Hornung, Philipp Sonnleitner, Sonja Ugen, Pascale Esch & Rachel Wollschläger

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## **Befunde aus dem nationalen Bildungsmonitoring ÉpStan vor dem Hintergrund der COVID-19-Pandemie**

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# Findings from the ÉpStan National Education Monitoring against the Background of the COVID-19 Pandemic

**Antoine Fischbach, Joanne Colling, Jessica Levy, Ineke M. Pit-ten Cate, Cassie Rosa, Charlotte Krämer, Ulrich Keller, Sylvie Gamo, Caroline Hornung, Philipp Sonnleitner, Sonja Ugen, Pascale Esch and Rachel Wollschläger**

The world has been in a pandemic state of emergency for almost two years, and current evidence from international studies suggests that pandemic-related school closures in 2020 had a negative impact on student achievement and that certain groups of students were more affected than others. Now the results of the *Épreuves Standardisées* (ÉpStan) [Standardized Tests] from autumn 2020 offer a comprehensive dataset for the first time that enables us to provide initial answers to the questions as to the extent to which school closures during the first phase of the COVID-19 pandemic in the spring of 2020 affected the performance of the Luxembourg student body and how distance learning was perceived by parents and students. While the overall results show that performance has remained largely stable, the results indicate that the German language skills of Luxembourgish students have deteriorated. The pandemic-related learning gaps in mathematics are somewhat less pronounced than in language skills. Consistent with findings from other countries, students from socio-economically disadvantaged households are more affected by achievement gaps than students from socio-economically advantaged households. Parents and students seem to have coped rather well with distance learning overall, with German in elementary school and math in secondary school being perceived as somewhat more challenging. Areas of action can be deduced from these initial results: The promotion of German skills seems particularly crucial and should start as early as possible in elementary school. Broken down by socio-demographic characteristics, the findings moreover show that in the Luxembourg school system in general, and reinforced by the pandemic, students who come from socio-economically disadvantaged households, who do not speak any of the languages of instruction at home, or who attend one of the two branches of the ESG (ESG or ESG-P) are particularly at risk. Accordingly, they should receive targeted support in order to actively counteract the risk of learning deficits at an early stage. Overall, the combined extraordinary efforts of teachers, parents/guardians and, of course, the students themselves seem to have resulted in a largely positive outcome from the first school year affected by the COVID-19 pandemic. Only the ÉpStan of the coming years will show how the pandemic-related changes will affect the performance of the Luxembourg student body in the long term.

## 1. Introduction

### 1.1. Previous findings from other countries

The world has been battling the COVID-19 pandemic for almost two years. To contain the spread of the coronavirus SARS-CoV-2, schools in 188 countries were closed and switched to distance learning in spring 2020 (OECD, 2021). This affected more than 1.5 billion students, but the long-term impact of this transition on their learning and academic achievement is still uncertain. Previous research on the impact of school closures has focused either on holiday periods or on temporary extreme situations (such as severe weather). Both had a negative impact on student progress, especially in mathematics (Kuhfeld et al., 2020). School closures related to the COVID-19 pandemic differed from these scenarios,

however, because in most countries school life could be maintained through alternative learning opportunities (such as distance learning), and students in distance learning could rely, at least in part, on the support of their parents and teachers. These support offers also tended to target young children and students from disadvantaged households (such as those with low socio-economic status) to reduce potential learning gaps and educational inequalities (OECD, 2021). Initial cross-national findings however suggest that inequalities between different groups of students in terms of access to education have been exacerbated by pandemic-related school closures in many countries around the world (OECD, 2021).

Moreover, the results of previous modelling studies on the impact of school closures on students' learning progress suggest that the suspension of face-to-face instruction during the COVID-19 pandemic led to a significant decrease in learning progress in reading (Bao et al., 2020; Kuhfeld et al., 2020) and mathematics (Kuhfeld et al., 2020). In fact, initial studies on the impact of the COVID-19 pandemic on student performance confirm this hypothesis: irrespective of the country in which the studies were conducted, learning losses are noted in reading, general language skills, and mathematics (Andreu et al., 2020; Blainey et al., 2020; Engzell et al., 2021; Hammerstein et al., 2021; Maldonado & De Witte, 2020; Tomasik et al., 2020). However, while some studies conclude that achievement loss is less pronounced in mathematics than in reading (Andreu et al., 2020) or in general language skills (Maldonado & De Witte, 2020), Blainey et al. (2020) report that school closures had a greater impact on achievement in mathematics than in reading. Moreover, the data reveal that certain groups of students particularly struggle with the negative effects of school closures on school performance: For example, younger children are more affected than older children and students from socio-economically disadvantaged households are more affected than students from socio-economically advantaged households (Blainey et al., 2020; Engzell et al., 2021; Maldonado & De Witte, 2020; Tomasik et al., 2020).

Current research therefore suggests that the pandemic-related school closures in 2020 had a negative impact on student performance and that certain groups of students were more affected than others (Hammerstein et al., 2021). Against this background, this paper aims to provide first answers to the question as to the extent to which the school closures of the first COVID wave in spring 2020<sup>1</sup> affected the performance of the Luxembourg student population. To this end, the results of the last *Épreuves Standardisées* (ÉpStan) from the fall of 2020 are compared with the results of previous years and the differences between the students with respect to their socio-demographic and school characteristics are taken into account.

The initial situation in Luxembourg can be compared with the conditions in other countries only to a limited extent: On the one hand, the Luxembourgish student body is very heterogeneous, especially with regard to the students' linguistic background, but also with regard to their socio-economic characteristics (cf. SCRIPT & MENJE, 2020a, 2020b, 2020c). On the other hand, the multilingualism of the Luxembourg school system poses a particular challenge that is hardly comparable to the requirements of other school systems. It is therefore conceivable that the school closures during the COVID-19 pandemic had a particularly negative impact on the performance of Luxembourg's student body. Then again, Luxembourg's digital infrastructure has been greatly expanded in recent years (see SMC, 2020), which may have had a positive impact on pandemic-related distance learning (i.e. *Schoul doheem*). Moreover, in a European comparison, schools in Luxembourg were fully or partially closed for a shorter period of time (UNESCO, 2021). The prompt return to face-to-face teaching - albeit under strict hygiene measures and extremely flexible teaching models - may also have had a positive impact on student performance.

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<sup>1</sup> ÉpStan data on the subsequent waves were not yet available when this education report went to press. A detailed analysis of the subsequent waves is, of course, planned.

## 1.2. School closures/deviations from regular education in Luxembourg

On 13 March 2020, the Luxembourg government ordered the suspension of school and education activities in attendance from 16 to 29 March 2020 (MENJE, 2020a) to slow the spread of SARS-CoV-2. All school activities were switched to distance learning (i.e., *Schoul doheem*), effective immediately. In light of the rising numbers of COVID-19 cases in spring 2020, however, the government was forced to extend the timeframe of school closures several times (MENJE, 2020b, 2020c). It was not until May 2020 that primary and secondary schools were able to reopen, after the students in each class were divided into two groups: Each of these groups was alternately taught at school for one week and went over what they had learned at home the following week (MENJE, 2020d). In the final secondary classes (1ère ESC/ESG), face-to-face classes resumed on 4 May, and in all other secondary classes on 11 May. Elementary school students returned to school on 25 May. Finally, on 29 June, the government decided to reunite the groups, thus ending the "alternating classes" (MENJE, 2020e). Overall, however, the measures taken to contain the virus during the first COVID-19 wave resulted in elementary school students being taught from home for a total of 10 weeks and secondary school students for 7 to 8 weeks.

In order to support those students who had difficulties with the distance learning situation, the government set up a summer school during the last two weeks of the summer holidays (August 31 - September 11, 2020): A total of 4,830 elementary school students and 797 secondary school students attended tutoring courses during this period, which were intended to make up for pandemic-related learning shortfalls and gaps (MENJE, 2020f). The tutoring courses for elementary school students focused on German and, in the higher levels, also on French; the majority of secondary school students, on the other hand, enrolled in courses with mathematical content (MENJE, 2020f). The courses were complemented by the digital learning platform *schouldoheem.lu* and a dedicated helpline aimed at providing pedagogical advice and support to students and their parents or guardians.

## 2. ÉpStan 2020

### 2.1. Information about the survey

The *Épreuves Standardisées* (ÉpStan) are standardized achievement tests administered each fall in Luxembourg's mainstream schools (Martin et al., 2015). They aim to measure key skills of primary and secondary school students in Luxembourgish, German, French, and mathematics and to assess the extent to which the educational standards defined by the Ministry of Education for the respective grades have been achieved. As the ÉpStan systematically take into account the socio-economic and sociocultural backgrounds of the students (such as gender, migration and language background, and the socio-economic status of the parents), they allow fair comparisons of performance.<sup>2</sup> In autumn 2020, the ÉpStan took place as usual. The data collected during this process provide key insights into the impact of the COVID-19 pandemic on the national education system.

### 2.2. Information on parent and student questionnaires

In addition to achievement tests, ÉpStan uses questionnaires to collect data on students' personal characteristics (such as self-concept, interest, school anxiety, and motivation to learn) and background characteristics (such as gender, socio-economic status, and language and migration background). In order to understand how families perceived their time in distance learning in the 2019/20 school year, additional questions about distance learning were added to the questionnaires for parents and

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<sup>2</sup> Further information on the ÉpStan as well as analyses aimed at longitudinal comparison of the ÉpStan data can be found in Sonnleitner et al. and Hornung et al. in this volume and at [www.epstan.lu](http://www.epstan.lu).

guardians in elementary school and to the student questionnaires in secondary school in fall 2020. These additional questions covered:

- Coping (in general and in different school subjects).
- Infrastructure (technical, material and spatial equipment)
- Motivation and enjoyment
- Additional support
- Contact with teachers
- Compatibility of work and distance learning

Parents and guardians as well as students were asked to indicate to what extent they agreed with statements on each area on a scale of 1 (*no or do not agree at all*) to 4 (*yes or fully agree*).

### 2.3. Sample and survey

The results presented here are based on fully representative data from approximately 23,000 students from four different grades of elementary and secondary school, 15,000 parents or guardians (elementary school only), and comparative data from 160,000 students from previous elementary and secondary school years (2014 to 2019).<sup>3</sup> The ÉpStan were administered regularly in November 2020 and in class.<sup>4</sup>

The sociodemographic characteristics of each cohort can be found in Table 1. An index of the occupational status of the parents or guardians (ISEI) is also given. It can take on values between 10 (e.g., for food service staff) and 89 (e.g., for physicians) (Ganzeboom, 2010; Ganzeboom & Treiman, 1996). Socio-economic status is derived from the highest ISEI (HISEI) of the parental home: In the following, socially advantaged (hereinafter: high SES) denominates those students for whom the highest occupational status of the parents is in the highest quartile; socially disadvantaged (hereinafter: low SES) are those for whom the highest occupational status of the parents is in the lowest quartile. Thus, the two outer quartiles are compared.

Table 1: Detailed sample description of the ÉpStan 2020 cohort.

	N	% female	% without migration background	% speaks Luxembourgish/ German at home	HISEI (mean value)	% without answer in COVID questionnaire	
C2.1	5.977	48	39	43	49,9	8,8	
C3.1	5.421	49	42	43	48,5	5,4	
C4.1	5.395	49	40	44	48,3	4,4	
9th grade	5.781	46	40	44	43,4	9,4	
9th grade	ESC	1.790	54,2	59	65	54,2	9,7
	ESG	3.462	44,6	33	35	44,6	9,4
	ESG-P	529	32,1	28	31	31,1	8,3

Note: ESC = enseignement secondaire classique; [conventional secondary education] ESG = enseignement secondaire général - voie d'orientation [general secondary education – career path] ; ESG-P = enseignement secondaire général - voie de preparation [general secondary education – preparation path].

<sup>3</sup> It should be noted here that the ÉpStan are conducted in grades C2.1, C3.1, C4.1 of elementary school and in 7<sup>th</sup> and 5<sup>th</sup> grade of secondary school. 7<sup>th</sup> grade has been integrated since the 2018/19 school year, but so far only about half of the students in this grade participate, so the data are not (yet) representative and only allow for preliminary conclusions. For this reason, 7<sup>th</sup> grade is not included in this chapter.

<sup>4</sup> During the testing phase, individual students or entire classes had to postpone or cancel tests due to the pandemic. This was most frequently the case in 5<sup>th</sup> grade, where about 10% fewer students were tested than in previous years.

Based on the demographic characteristics in Table 1, the students who participated in the ÉpStan in 2020 were compared to previous cohorts. Despite the aforementioned test failures, the 2020 cohort is comparable to previous cohorts in all demographic characteristics.

### 3. Results

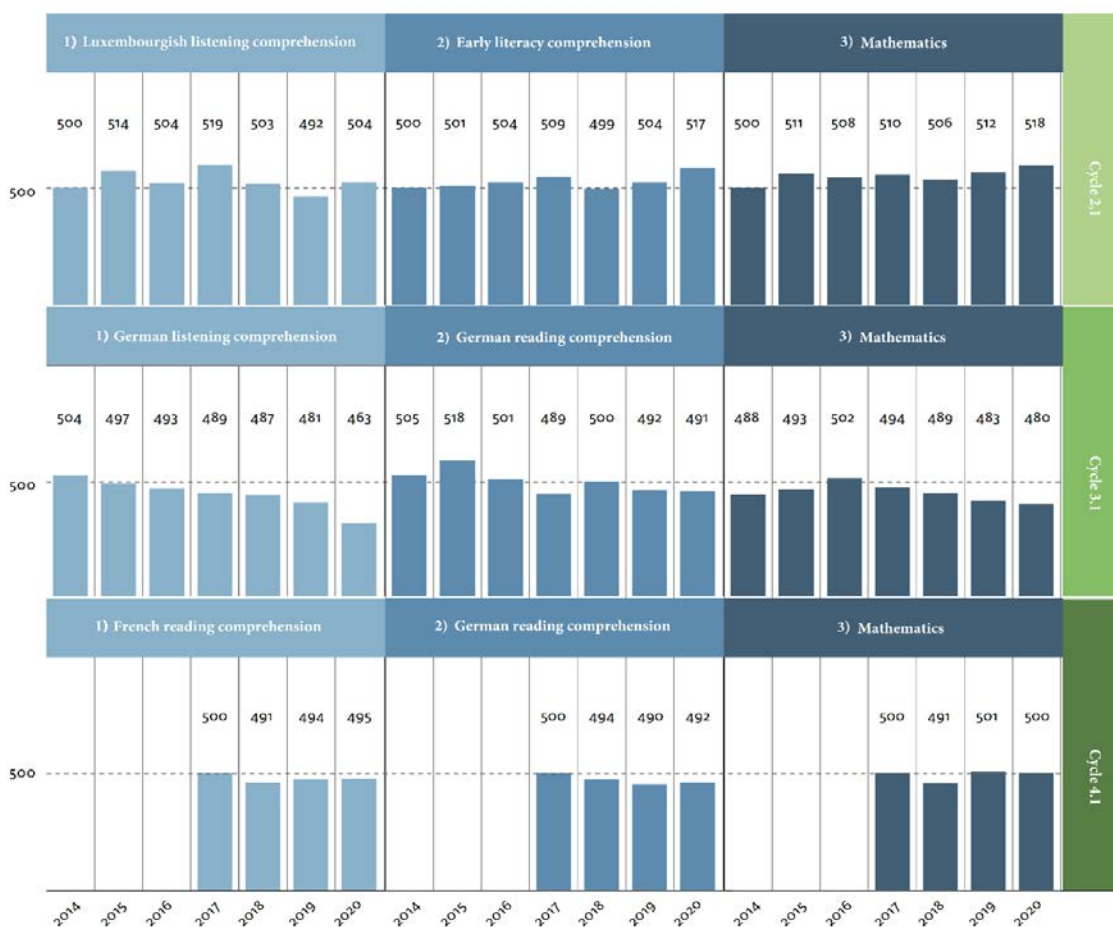
#### 3.1. Trends 2020: How did students compare to previous years?

In the following, overarching results that refer to the entire sample of elementary and secondary school students are presented below. The test results of different subgroups (e.g., broken down by socio-economic background, language background, or type of school) are then described. The findings described are exclusively cross-sectional data that make it possible to compare the ÉpStan results from 2020 with the results from previous cohorts. Thus, the data presented here do not aim to compare past and current performance of individual students, but rather to compare different cohorts (e.g., comparing all C2.1 students who attended this grade level in the 2018/19 school year with all C2.1 students who were in C2.1 in the 2019/20 school year, etc.).<sup>5</sup>

#### 3.2. Trends in elementary school

Figure 1 shows the trends from 2014 (or 2017 for C4.1) to 2020 for the competency areas of mathematics (C2.1, C3.1, and C4.1), Luxembourgish listening comprehension, and precursor skills of written language (C2.1), German listening and reading comprehension (C3.1), and German and French reading comprehension (C4.1).

Figure 1: Mean scores of the ÉpStan achievement tests in elementary school from 2014 to 2020.

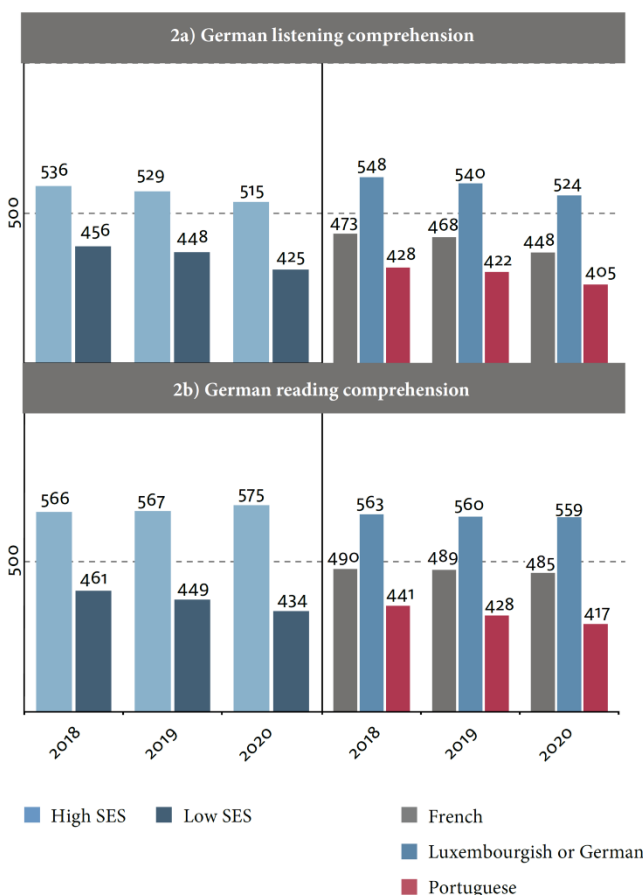


<sup>5</sup> An overview of the ÉpStan 2020 data and the associated educational trends can be obtained by using the ÉpStan dashboard ([dashboard.epstan.lu](https://dashboard.epstan.lu)).

While standardized test scores in the C2.1 and C4.1 cycles proved stable (compared to previous years), performance in C3.1 was worse than in previous years, especially in German listening comprehension. Students’ performance is reported in the ÉpStan metric. They are standardised so that the mean of the respective reference cohort is always a value of 500 and the standard deviation is always a value of 100 (Fischbach et al., 2014).

In German reading comprehension and German listening comprehension, children from socio-economically disadvantaged households and children who do not speak Luxembourgish or German at home have been performing significantly lower than their socio-economically advantaged classmates and children who speak Luxembourgish or German at home since the beginning of ÉpStan (see Figure 2). The trend over the last three years, however, looks different for German reading and listening comprehension: While mean test scores in **German listening comprehension** have worsened irrespective of socio-economic background and language group - slightly in 2019 and significantly in 2020 (see top row of Figure 2), the differences between groups in **German reading comprehension** have widened over time: The group of children who speak German or Luxembourgish at home or come from socio-economically advantaged households perform equally well or even achieve increasingly better results over the survey period, while lower performance is recorded for children from disadvantaged households and children who speak Portuguese at home compared to previous cohorts (see bottom row of Figure 2). Consequently, the measures taken in the spring of 2020 to contain the pandemic have not caused a new negative trend, but have exacerbated the differences that already exist between students with different sociodemographic characteristics.

Figure 2: Change in German listening and reading comprehension in C3.1 by socio-economic status (SES) and language background from 2018 to 2020.



### 3.3. Trends in secondary school

Figure 3 shows the general trends for 9<sup>th</sup> grade of secondary school. Compared to previous grades, performance in ESC proves relatively stable; in French reading comprehension, students even improved slightly in 2020. Conversely, students who attended one of the other two school tracks performed worse than earlier grades.

Figure 3: Mean scores on the ÉpStan achievement test in the 5<sup>th</sup> grade from 2014 to 2020, broken down by type of school

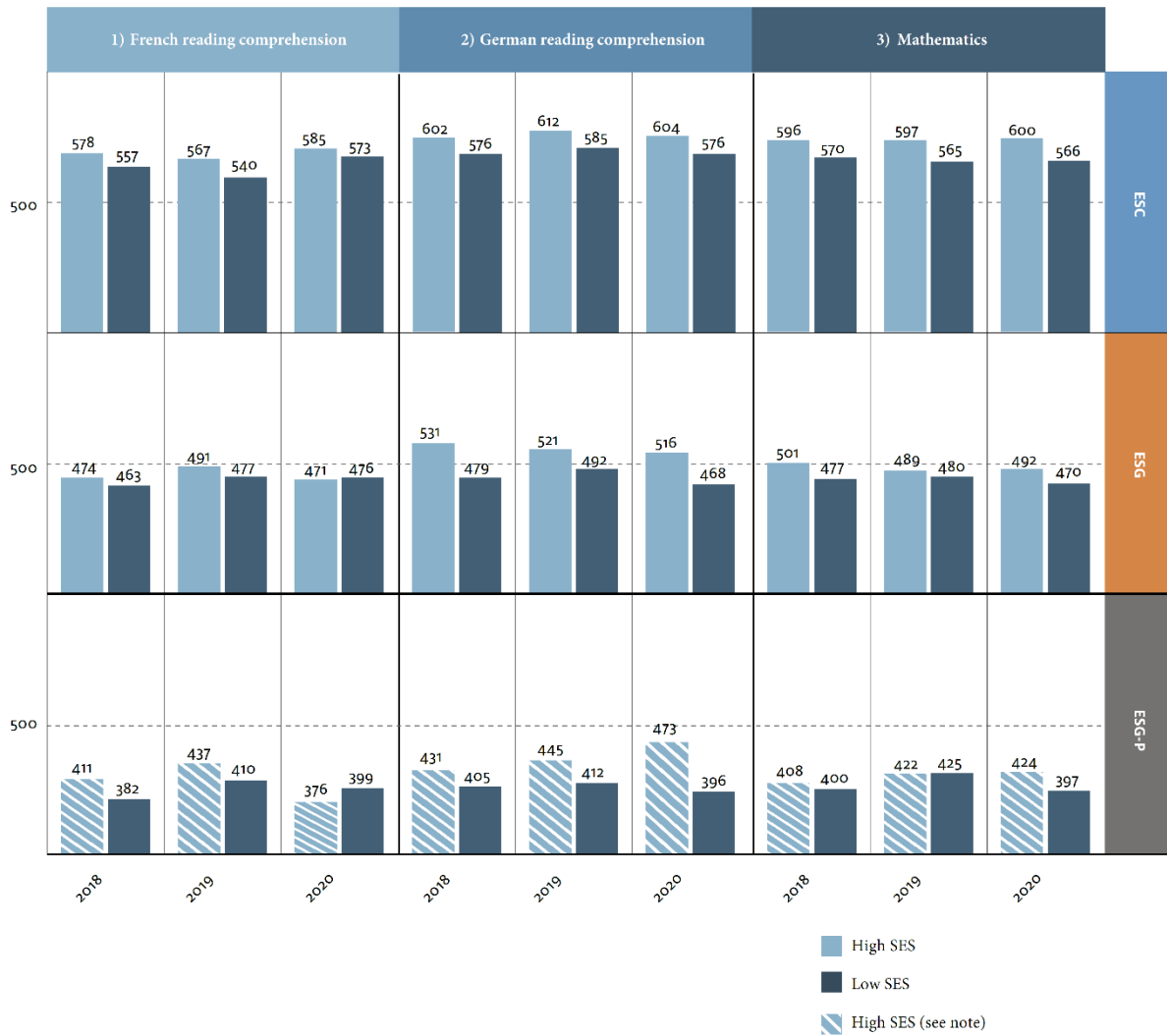


Note: Mean values per year, separated by school type

In addition, ninth graders from socio-economically disadvantaged households performed worse in mathematics and German reading comprehension than their socio-economically advantaged peers in all types of school (see Figure 4). Particularly the performance in German of socio-economically disadvantaged ESG and ESG-P students stands out negatively. Furthermore, in 2020, a decline in reading skills in German is also observed for all those students who do not speak any of the instructional languages (Luxembourgish, German and French) at home (for a detailed presentation of these results, additional materials are available on <https://doi.org/10.48746/BB2021LU-EN-34b>).



Figure 4: Results of the ÉpStan achievement tests in secondary school, mean values broken down by socioeconomic status (SES) and school branch.

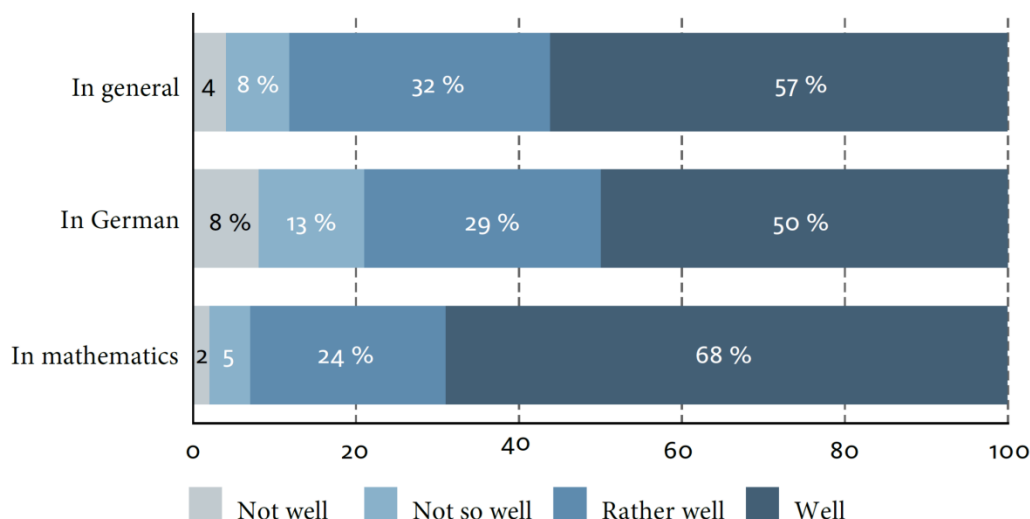


Note: In ESG-P, the number of socially advantaged students turns out to be very low. For the sake of completeness, the results are reported here, but due to the very small sample, comparisons between socially advantaged and socially disadvantaged students in ESG-P are not meaningful and should not be interpreted.

#### 4. COVID-19 questionnaire: How do parents in elementary school and students in secondary school assess the situation?

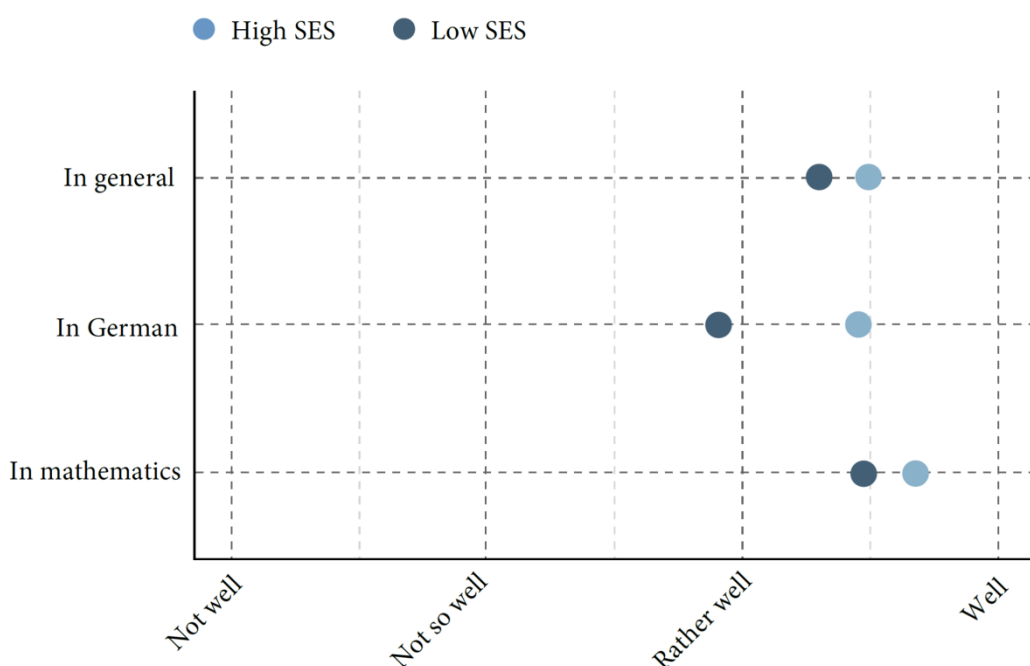
In addition to the achievement tests, ÉpStan 2020 used questionnaires to collect data on perceptions of distance learning in the 2019/20 school year. The results of the survey are presented below. The findings that apply to the entire sample of elementary and secondary students are presented first, followed by selected data related to different subgroups of students. Since the results are comparable across grade levels, they are described exemplarily for cycle 3.1 in elementary school and for grade 9 in secondary school (for a detailed presentation of results for other grade levels see bildungsbericht.lu).

Figure 5: Coping with distance learning in cycle 3.1, in general and broken down by subjects



Note: Depending on the question, between 9% and 11% of parents did not give an answer and between 1% and 2% indicated that an answer was not possible.

Figure 6: Coping with distance learning in cycle 3.1, mean values broken down by socio-economic background (SES)



## 5. In elementary school

### 5.1. Coping

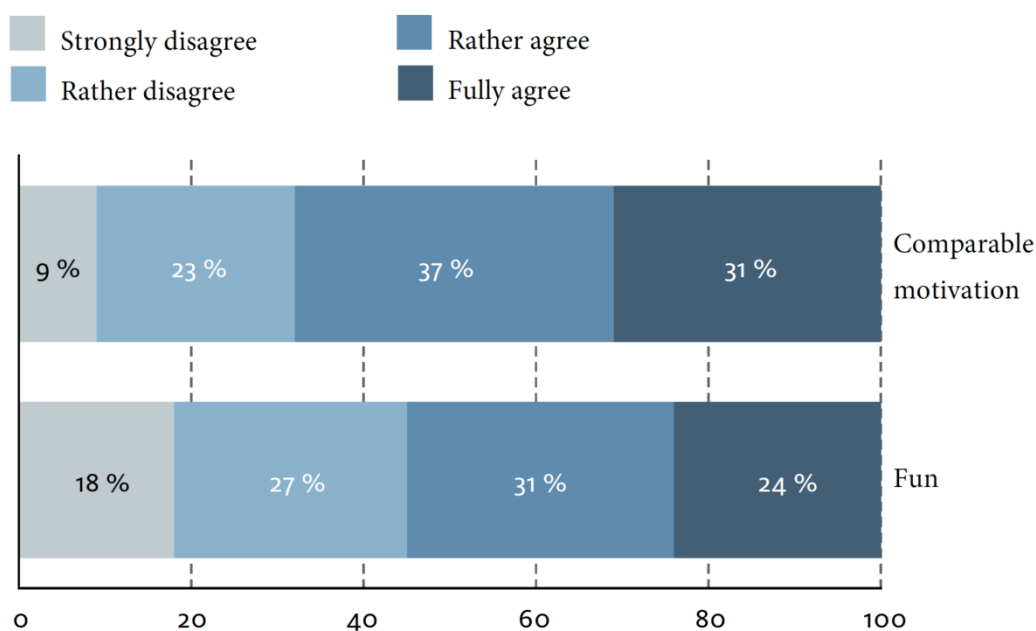
In elementary school, parents indicated that their children coped rather well with distance learning in general and in mathematics and French (cycle 4.1 only, see bildungsbericht.lu). However, as shown in Figure 5 for Cycle 3.1, distance learning in German was perceived as somewhat more challenging. Thus, 8% of parents reported not coping well with it, and another 13% reported somewhat not coping well.

This tendency is even more evident for students from socio-economically disadvantaged households (Figure 6): When it comes to coping with distance learning in German, the mean score of students from socio-economically disadvantaged households on a scale of 1 (*not good*) to 4 (*good*) according to their parents' assessment of 2.90 is significantly lower than the mean score of their socio-economically advantaged classmates (3.45). Differences are also apparent with regard to language background: the mean score of elementary school students who do not speak any of the instructional languages at home is significantly lower than the mean score of elementary school students who speak Luxembourgish or German in their family (see bildungsbericht.lu). There are no significant mean differences between girls and boys of primary school age in their ability to cope with distance learning.

### 5.2. Infrastructure

In addition to questions about coping with distance learning, parents of elementary school-aged children were also asked questions about the technical (e.g., access to the Internet, to a laptop/tablet), material (e.g., availability of office supplies), and spatial (e.g., availability of a quiet workspace) amenities of their families. The vast majority of parents reported being fairly well equipped: In spring 2020, 89% had good technical equipment, 94% had good material equipment, and 91% had a quiet workplace for their child(ren). Especially in socio-economically advantaged households, children in distance learning had access to a very good infrastructure (see bildungsbericht.lu).

Figure 7: Motivation and fun during distance learning in cycle 3.1.



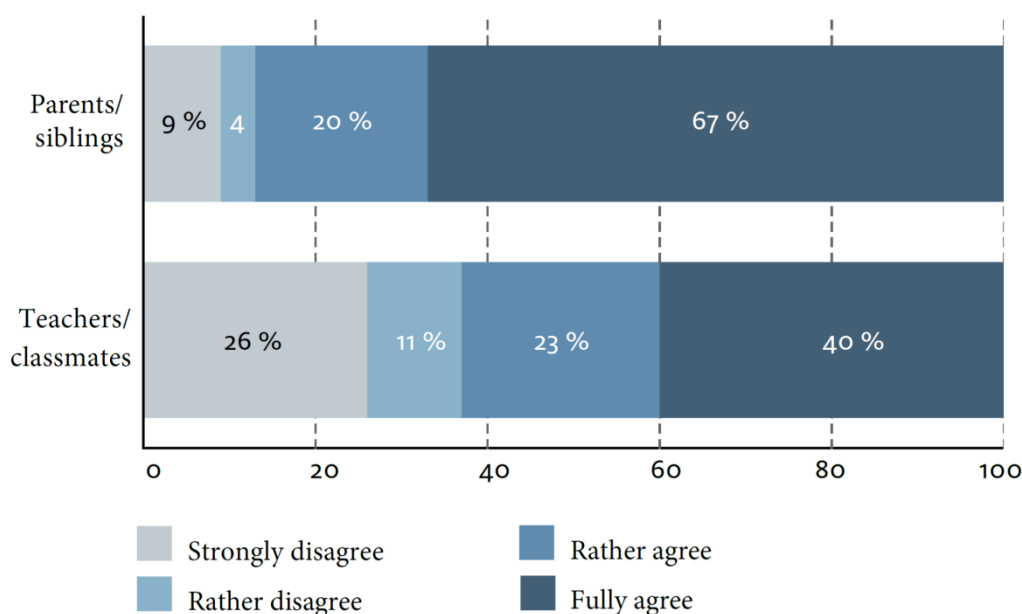
Note: Depending on the question, between 9% and 10% of parents did not give an answer and between 1% and 2% indicated that an answer was not possible.

### 5.3. Motivation and fun

Unlike the questions about coping with distance learning and the infrastructure available for that purpose, the responses of parents regarding their children's motivation and enjoyment of distance learning (compared to regular face-to-face learning) were more mixed: As shown in Figure 7, about two thirds of parents agreed with the statement that their child's motivation in distance learning was

comparable to their child's motivation in regular face-to-face education. However, 23% of parents tended not to agree and 9% did not agree at all. Regarding motivation, there were no mean differences between students with different socio-economic backgrounds (see bildungsbericht.lu for more details). Regarding the enjoyment of distance learning, the responses of the parents were even less consistent, with only about half stating that their children enjoyed distance learning, while the other half of parents tended to agree (27%) or disagreed (18%). Whereas socio-economically disadvantaged students, on a scale of 1 (strongly disagree) to 4 (fully agree), with a mean of 2.73, were slightly above the mean of their socio-economically advantaged peers (2.52) when it came to enjoying distance learning. The parents of girls also reported slightly higher motivation than the parents of boys, although boys and girls did not differ in their experienced enjoyment of distance learning according to their parents (in Cycle 2.1 alone, girls seem to have had slightly more enjoyment of distance learning than boys, see bildungsbericht.lu). Overall, however, the differences between girls and boys turned out to be very small.

Figure 8: Additional support during distance learning in cycle 3.1



Note: Depending on the question, 9% of parents did not give an answer and between 2% and 5% indicated that an answer was not possible.

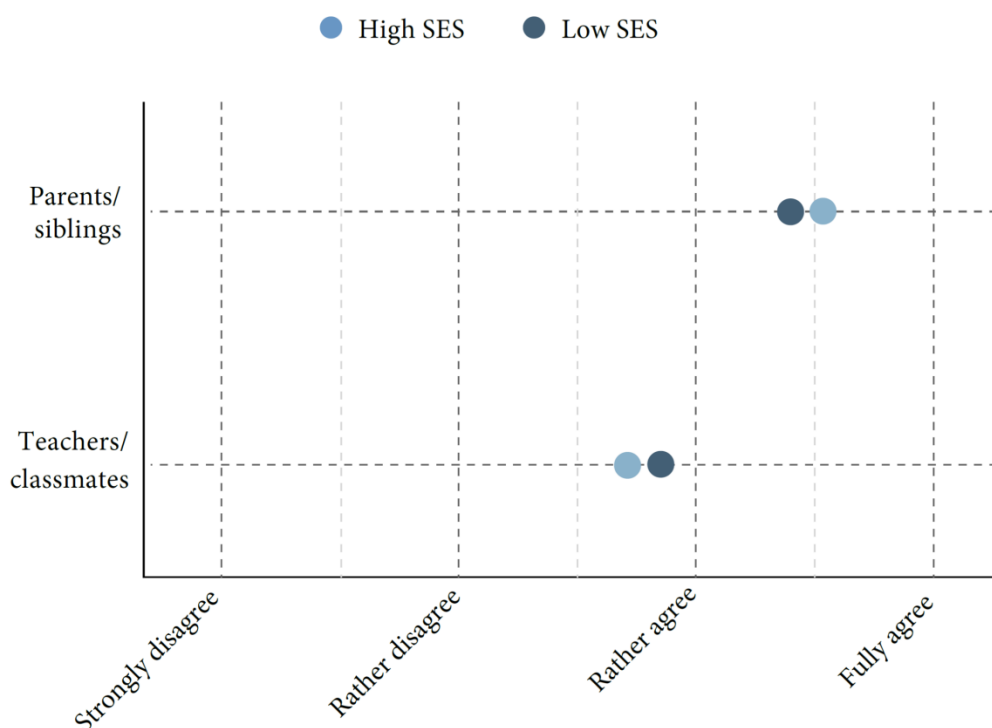
#### 5.4. Additional support

When asked if the children had received additional help from their parents and/or siblings when needed, 87% of parents responded in the affirmative. However, the responses of the parents were less consistent regarding additional support from teachers and/or classmates: While the majority of students (63%) reported receiving additional help from their teachers and/or classmates when needed, 11% of parents tended to disagree with this statement and another 26% did not agree at all (see Figure 8).

When the statements of parents of students from socio-economically advantaged households are compared with the statements of parents of socio-economically disadvantaged students, differences between the two subgroups also become apparent with regard to additional support during distance learning: Students from socio-economically advantaged families received slightly more support from

parents and/or siblings when needed (mean 3.54, on a scale from 1 (strongly disagree) to 4 (fully agree)) than students from disadvantaged households (3.40). In the case of additional support from teachers and/or classmates, on the other hand, the picture is reversed (see Figure 9): Here, it is students from socio-economically disadvantaged households who receive a slightly higher level of additional support from their teachers and/or classmates (2.85) than their socio-economically advantaged classmates (2.71). A similar picture emerges with respect to the language background of students: Pupils with a Portuguese language background were on average (2.94) more supported by their teachers and/or classmates than pupils with a German/Luxembourgish (2.66) or French language background (2.80; see additional material on bildungsbericht.lu). This could be an indication that the support provided by teachers was geared to the actual needs of the students and was particularly targeted at students who had already been identified in previous studies as possible at-risk groups in the Luxembourg school system (Hoffmann et al., 2018; Keller et al., 2014).

Figure 9: Additional support during distance learning in Cycle 3.1, mean values broken down by socio-economic status (SES).



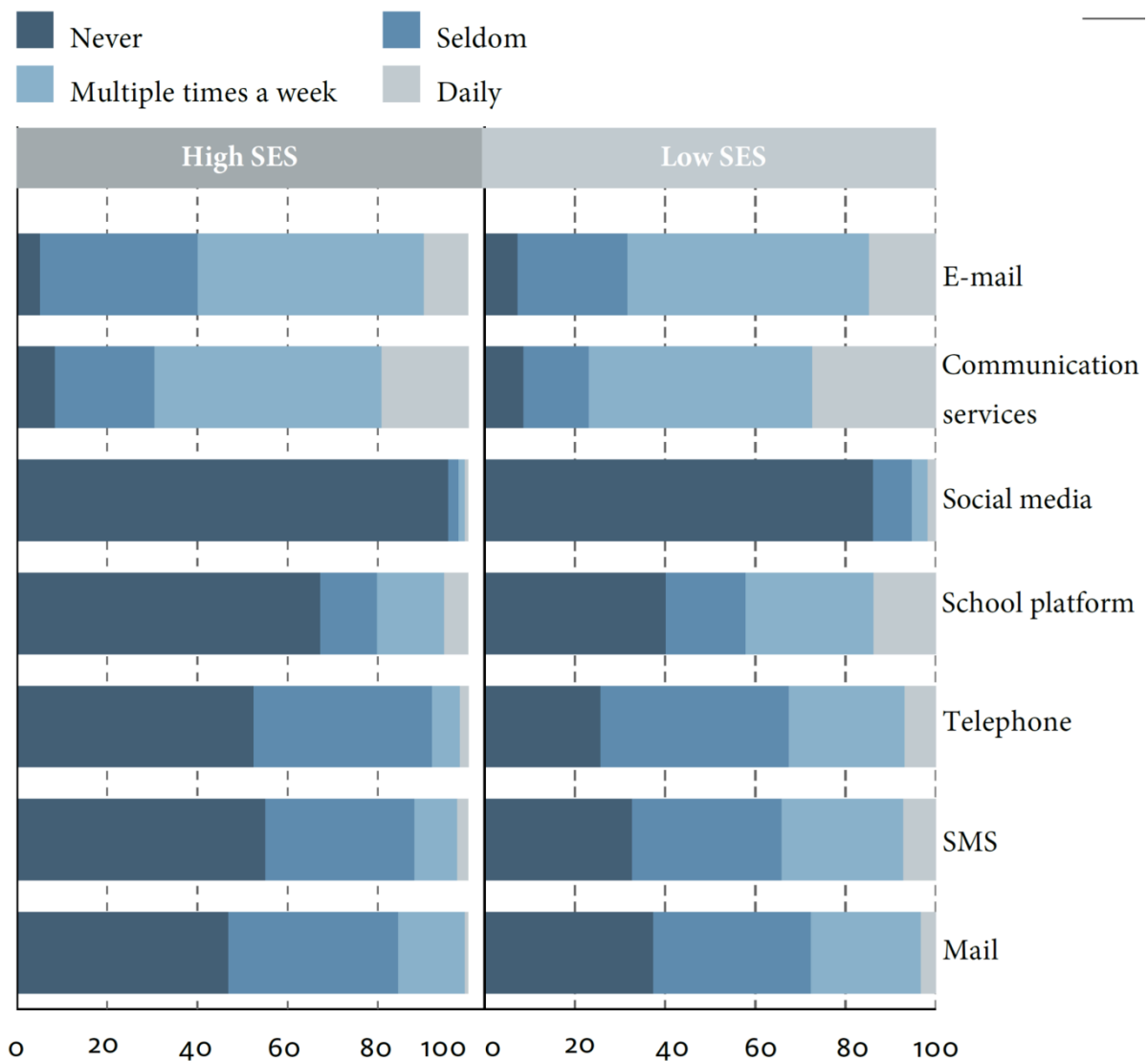
Note: SES = Socio-economic Status

### 5.5. Contact with teachers

In elementary school, teachers and students/parents were in regular contact with each other during the period of distance learning, mostly via email or digital communication services such as *Microsoft Teams* or *Zoom*. However, face-to-face meetings with teachers and/or visits were also reported (see bildungsbericht.lu). Parent responses also indicate that teachers deliberately chose the particular communication channel: As shown in Figure 10, socio-economically disadvantaged households not only reported more frequent contact with teachers, it also came more often in the form of additional phone calls, text messages, and letters. This finding supports the proposition that students from socio-

economically disadvantaged households were more likely to receive additional support from their teachers and/or classmates when needed.

Figure 10: Contact with teachers during distance learning in elementary school, exemplary for cycle 3.1



Note: Broken down by socio-economic background (SES)

### 5.6. Compatibility of work and distance learning

Regarding the compatibility of work and distance learning, 61% of parents agreed with the statement that their own work was well balanced with distance learning. However, 24% of parents tended to disagree with this statement and another 15% did not agree at all. The mean values show that parents from socio-economically disadvantaged households were slightly more positive about their ability to balance work and distance learning (2.91) than parents from socio-economically advantaged households (2.61; see bildungsbericht.lu). This result could be related to the fact that parents from socio-economically disadvantaged households were less likely to report having worked in a home office for one and also more likely to report having availed themselves of the *congé pour raisons familiales* [leave for family reasons]. In this respect, they were presumably also less often confronted with the task of having to reconcile their own work at home with their children's distance learning. It should be

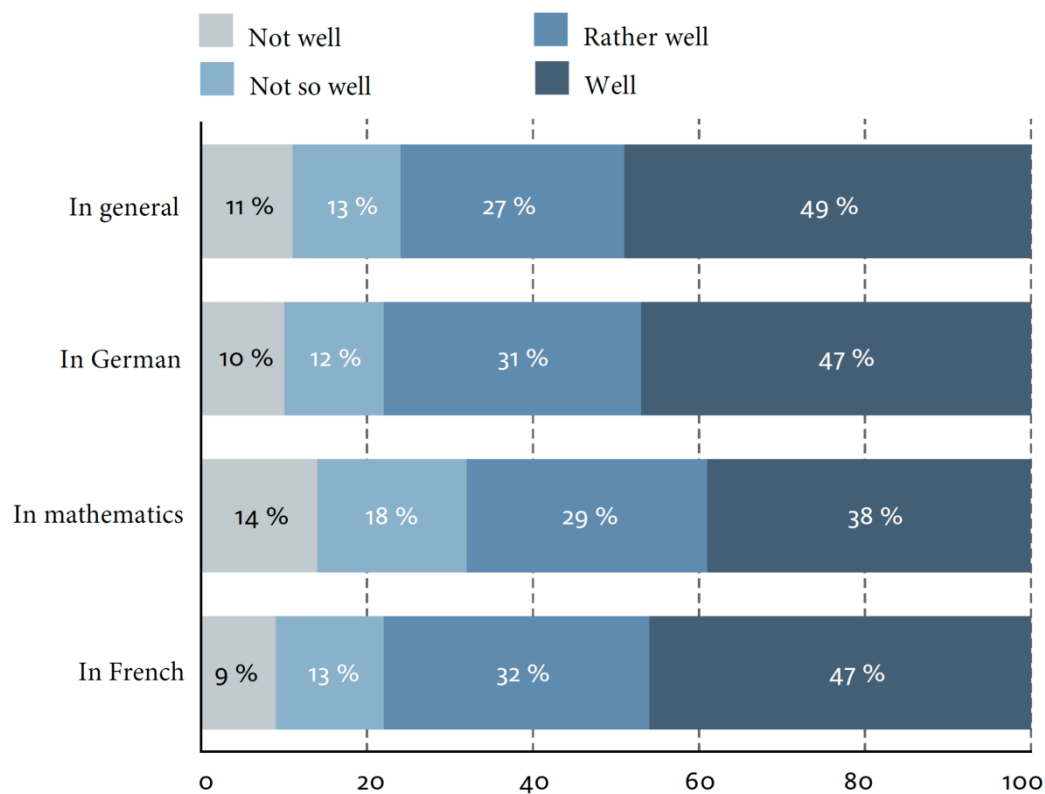
noted, however, that no further information is available on who cared for the children when the parents did not work from home. There appear to have been certain conditions that made it easier for these parents to balance distance learning and work, but the specific factors are not clear from the available data.

## 6. In secondary school

### 6.1. Coping

In secondary school, the majority of 9th grade students reported coping rather well with distance learning in general and in German and French. As shown in Figure 11 for 9<sup>th</sup> grade, distance learning in mathematics was perceived as somewhat more challenging, unlike in elementary school: Thus, 14% of ninth graders reported not coping well, and another 18% reported somewhat not coping well.

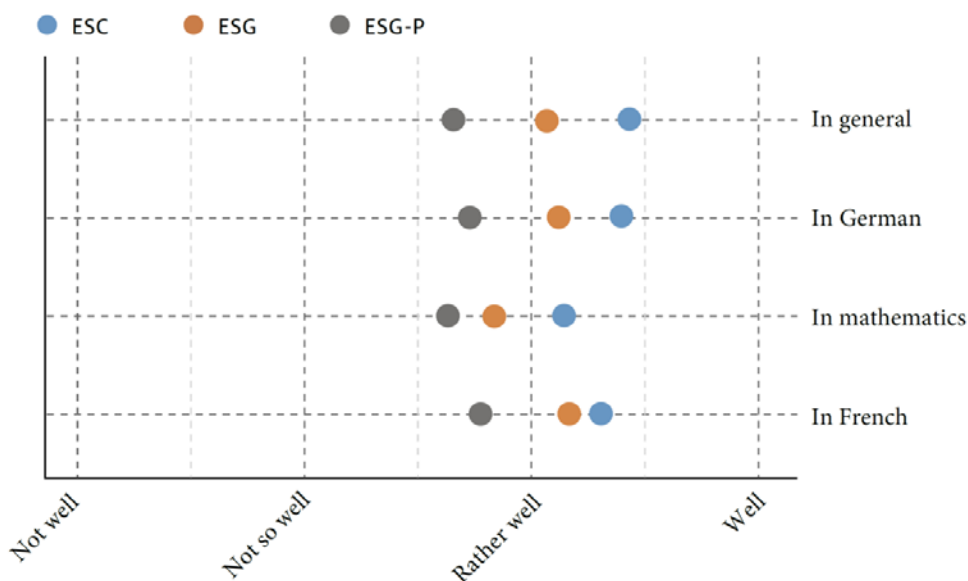
Figure 11: Coping with distance learning in the 9<sup>th</sup> grade



Note: Depending on the question, between 4% and 5% of students did not answer, and between 5% and 7% indicated that an answer was not possible.

When the different types of school of the Luxembourg secondary school system are considered, ESC students were the most comfortable with distance learning, while ESG and ESG-P students were somewhat less comfortable (see Figure 12): On a scale from 1 (not good) to 4 (good), the mean value for coping with distance learning in ESG-P is generally 2.65, which is significantly lower than the mean value of ESG (3.05) and ESC (3.40).

Figure 12: Coping with distance learning in the 9<sup>th</sup> grade, mean values broken down by type of school



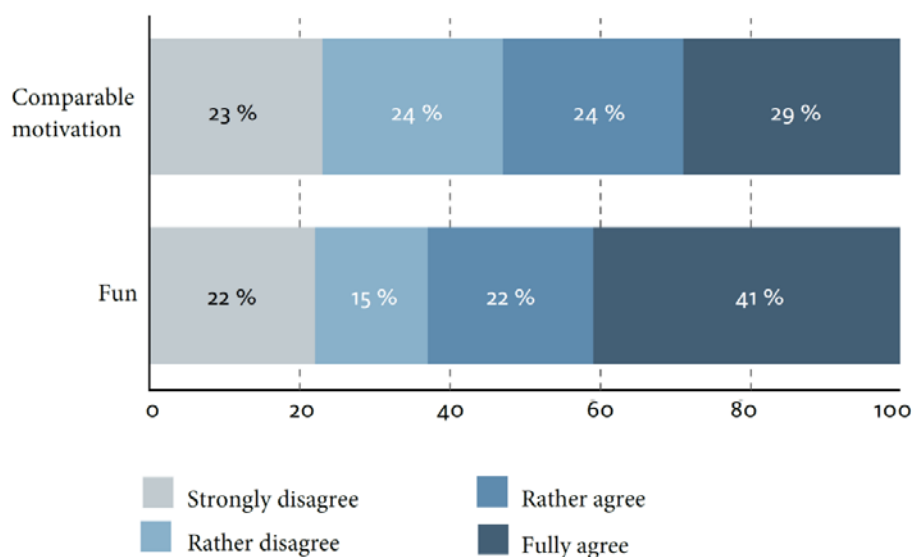
### 6.2. Infrastructure

Akin to elementary school, the vast majority of students in secondary school reported having good technical and spatial facilities during distance learning. The percentage of students who expressed agreement was 85% in terms of technical facilities and 87% in terms of the availability of a quiet workspace. The results also indicate that the situation may have been somewhat better in higher school grades and/or in socio-economically advantaged households (see bildungsbericht.lu).

### 6.3. Motivation and fun

When asked about their motivation in distance learning, about half of the ninth graders agreed that it was comparable to their motivation in regular face-to-face classes (see Figure 13). However, 24% of the students tended to disagree and 23% did not agree at all.

Figure 13: Motivation and fun during distance learning in 9<sup>th</sup> grade



Note: Depending on the question, between 6% and 7% of students did not give an answer and 5% indicated that an answer was not possible.

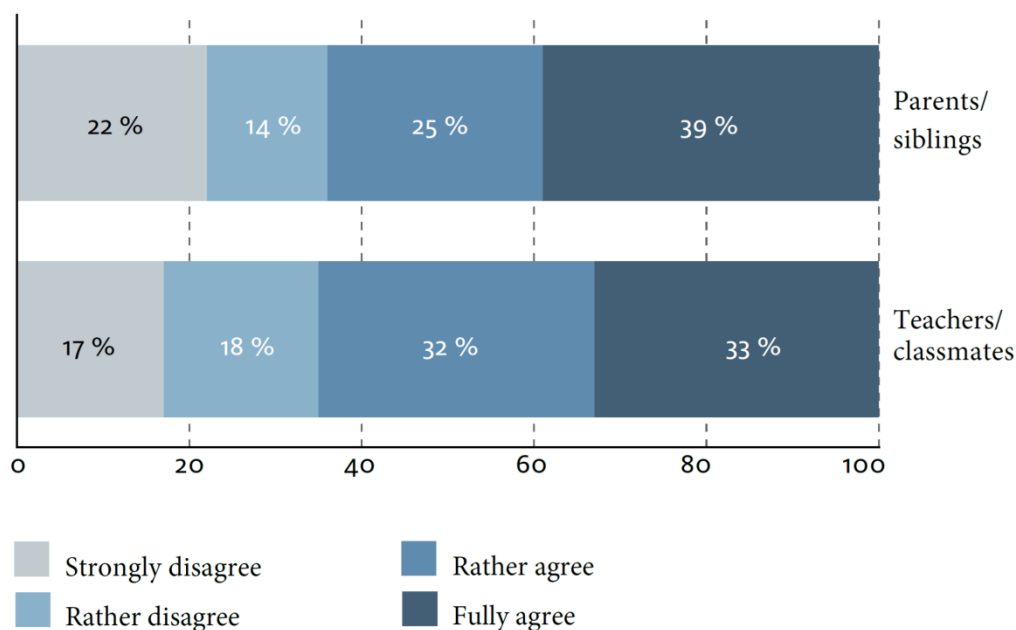


When the different types of school are considered separately, there are no mean differences between ESG (2.54) and ESG-P (2.50) on a scale of 1 (*strongly disagree*) to 4 (*fully agree*). ESC students had a slightly higher mean score (2.71) in terms of motivation. In regard to fun, about two thirds of the students agreed with the statement that they enjoyed distance learning as much as regular face-to-face classes. However, one third of the students disagreed with this statement (15%) or did not agreed at all (22%). Differences in the mean values between school branches appear here as well: With a mean of 2.98, ESC students enjoyed distance learning more than ESG (2.75) and ESG-P (2.53) students. Accordingly, ESG and ESG-P students were less motivated in distance learning and also enjoyed it less (see bildungsbericht.lu).

#### 6.4. Additional support

Regarding the question whether the students got additional help from their parents and/or siblings when needed, almost two thirds of the students agreed. Unlike in elementary school, however, 14% tended not to agree and 22% did not agree at all. With regard to additional support from teachers and/or classmates, the picture is similar: While the majority of students (65%) received additional help from their teachers and/or classmates when needed during distance learning, 18% of students tended to disagree and another 17% disagreed (see Figure 14).

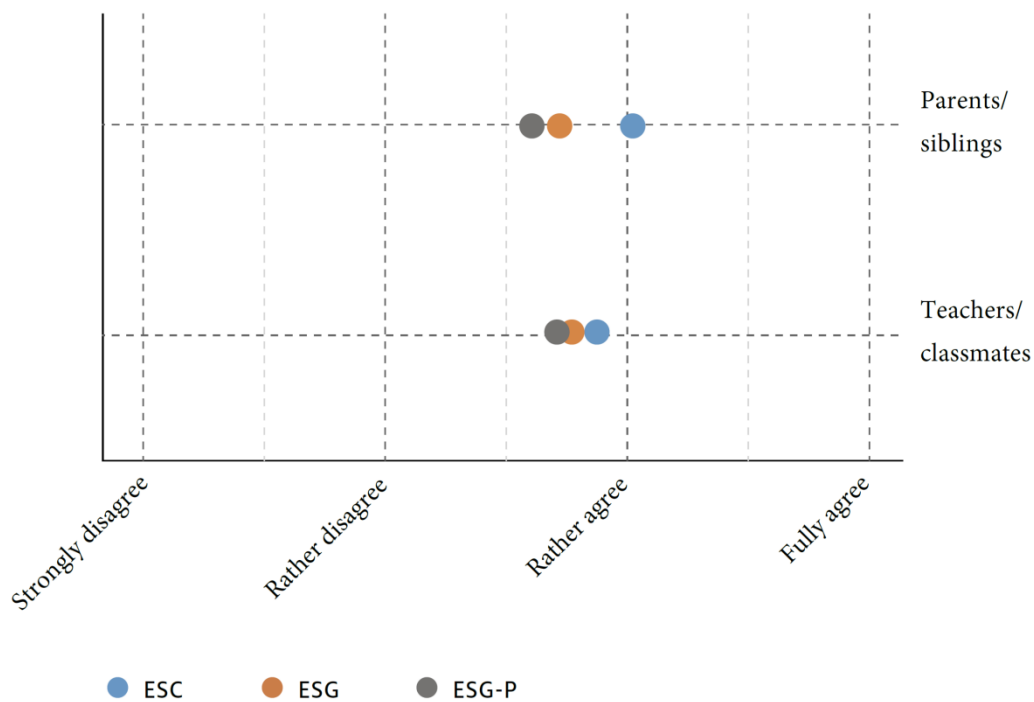
Figure 14: Additional support during distance learning in 9<sup>th</sup> grade



Note: Depending on the question, between 6% and 7% of students did not give an answer and between 6% and 7% indicated that an answer was not possible.

When the responses of students from the different school branches are compared, group differences in mean scores emerge (see Figure 15): ESC students were more likely to report receiving additional support from their parents and/or siblings when needed (3.03) than their ESG (2.75) or ESG-P (2.61) peers. ESC students were also slightly more likely to report need-based additional support from their teachers (2.88) than ESG (2.76) and ESG-P (2.73) students.

Figure 15: Additional support during distance learning in 9<sup>th</sup> grade, mean values broken down by type of school



### 6.5. Contact with teachers

Secondary school students were in regular contact with their teachers. Their main channels were communication services such as *Microsoft Teams* or *Zoom*, but overall the communication channels were more diverse than in elementary school. The results also suggest that different communication channels were used in different school branches, with ESG and ESG-P students having more frequent contact with their teachers, especially in the form of phone calls, text messages, and letters. Students from ESG-P also reported more personal contact with their teachers (see [bildungsbericht.lu](https://bildungsbericht.lu)).

## 7. Summary and discussion of the results

For almost two years, the world has been in a state of pandemic emergency, characterized by strict hygiene measures, contact and curfew restrictions, the closure of restaurants, cultural institutions and shops, and the transfer of school and work to the private sphere. And, of course, the COVID-19 pandemic also posed an unprecedented challenge to the Luxembourg school system.

Initial findings from abroad now confirm the results of previous modeling studies that predicted a loss of competencies in mathematics and general language and literacy skills caused by the accompanying pandemic containment measures (such as the temporary suspension of classes or the switch to distance learning) (Andreu et al., 2020; Blainey et al., 2020; Engzell et al., 2021; Maldonado & De Witte, 2020; Tomasik et al., 2020). Against this background, this paper presented key findings on the impact that pandemic containment measures had on Luxembourg's primary and secondary schools. The data basis for this was provided by the ÉpStan from fall 2020 and the accompanying questionnaires for parents/guardians and students\*. However, the data presented in this paper not only allowed for a differentiated view of the Luxembourg school system in the pandemic year 2020; they also indicate

areas for action, which are described following the summary of the results, and which aim not only to improve the Luxembourg school system but also to prepare it for future challenges.

First, it is important to reiterate that the ÉpStan results presented here do not provide information about how individual students performed prior to the pandemic and how they may have changed as a result of the virus containment measures. Instead, the ÉpStan data presented here represent snapshots that map the performance of the 2020 pandemic cohort, which in turn can be compared to the performance of earlier cohorts (2019, 2018, etc.).

As in other countries, the results of the ÉpStan 2020 indicate that the pandemic-related learning gaps in learning gaps in mathematics are somewhat less pronounced than in language skills (Andreu et al., 2020; Maldonado & De Witte, 2020). In particular, the German skills of the Luxembourgish student population have deteriorated - both in primary and secondary school. In secondary school, however, there have also been selective gains in skills (for example, in the French reading skills of ESC students). In line with findings from other countries, Luxembourgish students from socio-economically disadvantaged households are also more affected by achievement losses than students from socio-economically advantaged households (Blainey et al., 2020; Engzell et al., 2021; Maldonado & De Witte, 2020).

As expected, technical, material, and spatial equipment for students did not pose a major challenge in the transition from face-to-face to distance education (Di Pietro et al., 2020; STATEC, 2020): most parents/guardians (of children in elementary school) and students (of secondary school) reported being sufficiently well equipped at the time of the transition in spring 2020. It is also worth noting that, unlike in other countries (Andrew et al., 2020), families in Luxembourg do not seem to be linked to the socio-economic status of their parents.

Another positive aspect is that teachers in distance learning succeeded for the most part in maintaining regular contact with parents/guardians and students. The available data also indicate that both the frequency of contact and the type of communication were based on the needs of the families.

When asked how much they enjoyed distance learning and how it affected their motivation, the Luxembourgish students responded differently: while some of them enjoyed distance learning and were just as motivated as in face-to-face classes, others were not (see also the study by Residori et al., 2020, which came to similar conclusions).

## 8. Areas of action

On the basis of these results, areas of action can be identified in which timely interventions and additional assistance appear to be urgently needed. The promotion of German should play a central role, since it has a prominent function in the Luxembourg school system as a literacy language: **The promotion of German skills is crucial and should start as early as possible in elementary school.** This is because, as the ÉpStan results on German listening comprehension in Cycle 3.1 demonstrate, the acquisition of these skills is a key challenge for broad segments of the Luxembourgish student population that cannot be attributed to individual language groups and/or specific socio-economic characteristics.

**Moreover, students who come from socio-economically disadvantaged households, who do not speak any of the languages of instruction at home, or who attend one of the two branches of the ESG (ESG or ESG-P) are particularly at risk in the Luxembourg school system.** Previous studies have

already pointed out the risks for these students (cf. Hoffmann et al., 2018b; Sonnleitner et al., 2018). Against the background of the current findings, however, targeted support seems urgently advised so that the (pandemic-related) learning gaps of these students can be addressed. Otherwise, they run the risk of remaining disadvantaged throughout their school years due to these learning deficits, which in the long term also increases the risk of having to repeat one or more grades - which has proven to be sparsely conducive in the past (cf. Hornung et al. and Sonnleitner et al. in this report) and/or prematurely drop out of school (MENJE, 2021).

## 9. Conclusion

Overall it can be stated that the measures taken in the Luxembourg school system in spring 2020 to contain the COVID-19 pandemic did not trigger a systematic negative trend that would have affected all students, subjects, and grade levels equally. While the data presented here suggest clear areas of action where additional interventions and assistance seem urgently needed, they also indicate that the Luxembourg school system has been able to cope well with the challenges posed by the pandemic in many areas: The resources devoted to the digitalization of schools have paid off, and other support measures of the Ministry of Education, such as the summer school in September 2020, have presumably compensated to some extent for the (pandemic-related) learning deficits of students.

The combined extraordinary efforts of teachers, parents/guardians and, of course, the students themselves have resulted in a largely positive conclusion to the first school year affected by the COVID-19 pandemic. However, only the ÉpStan of the coming years will show how the pandemic-related changes will affect the performance of the Luxembourg student population in the long term and whether it will be possible to counteract any disadvantages through targeted support measures.

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