



Article

Learning Patterns at the Time of COVID-19-Induced School Closures

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Abstract: Previous research has shown that COVID-19-induced school closures and the subsequent transition to online/digital distance education have had a negative effect on student achievement, and this is a negative effect particularly pronounced for students with low socioeconomic status, which foreshadows an increase in educational inequalities. In this study, we examined how students in schools at risk of dropout have adapted to this changed educational situation and what the individual, family and school-related characteristics are that differentiate their adaptation strategy. Our analysis is based on the responses of 3222 Hungarian seventh-grade students to an online survey. Cluster analysis was used to create four groups that illustrate differing perceptions of online/digital distance learning. Descriptive statistical methods were used to analyse and compare the learning patterns of these student groups. Our results show that students have not responded in the same way to changes brought about by COVID-19. There are fundamental differences between the two groups facing difficulties and the two groups experiencing fewer difficulties, but the former and the latter two groups differ on several other factors too. Students with unfavourable individual and family factors were more likely to have learning difficulties. In their case, the extent of support provided by the school is very important.

Keywords: primary education; online/digital distance learning; educational inequalities; online survey; student perception



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1. Introduction

The 2020 onset of the COVID-19 pandemic has posed significant challenges for national education systems. It is no coincidence that a number of social-science studies have focused on education and that education systems have been launched since the pandemic began. Most of this research in 2020 focused on how education was delivered during pandemic-related school closures, and the difficulties (including employability, household and childcare tasks, and mental well-being) that this caused for families, especially mothers (Amuedo-Dorantes et al. 2020; Huebener et al. 2021), but already in that year, there were predictions about the likely consequences (Azevedo et al. 2021). By 2021, the debate was mostly about the short- and long-term effects of forced school closures. While some of these writings explore the perspective of schools (Huber and Helm 2020), teachers (Hamilton et al. 2020; Jakubowski and Sitko-Dominik 2021), parents (Amuedo-Dorantes et al. 2020) or the learning environment (Blaskó and Schnepf 2020), most analyses have focused on learners, in particular on changes in learners' well-being and achievement caused by the COVID-19 pandemic and the impact of these changes on their educational, social and economic prospects, with a strong emphasis on the development of equal opportunities (Andrew et al. 2020; Blanden et al. 2021; Blaskó et al. 2021; Engzell et al. 2021; Blaskó and Schnepf 2020; Grewenig et al. 2020; Haack and Lefebvre 2020). This is also the subject of our study, which aims to show how students have adapted to the

changed teaching-learning conditions, and the student responses and learning patterns that can be identified in Hungarian primary education at the time of the first school closures.

1.1. Impacts of School Closures on Student Achievement

The magnitude of learning loss caused by the first school closure is comparable to the results of research on summer learning loss (Kuhfeld et al. 2020). Hence, even though distance education has been taking place, its effect on students' learning was as if it had been a summer break, i.e., as if there had been no education at all. Maldonado and De Witte's (2021) research shows that this relapse is not only due to the interruption of the learning process, but also to the loss of part of that which had been learned.

In addition to a wealth of primary research, systematic summaries have been published exploring the links between the COVID-19 pandemic and education. According to a systematic analysis by Hammerstein et al. (2021) which summarised 11 studies, there is clear evidence that COVID-19-induced school closures have had a negative impact on student achievement (these studies focused on developed countries and the first school closures) (cf. Zierer 2021). Donnelly and Patrinos (2021) compared eight studies, concluding that further research is needed to understand learning under COVID-19 as the results of these studies are inconclusive, and because the geographical scope of the primary studies as well as the number of students involved were limited.

The learning losses resulting from school closures can also have an impact on economic well-being at both the individual and country level (OECD 2021). Affected children graduate later (or not at all) from secondary school or college (early school leavers and drop-outs increase), which predicts reduced intergenerational mobility and is a barrier to human capital development (Chetty et al. 2020; Maldonado and De Witte 2021). Analyses to date suggest that the COVID-19 epidemic will hit affected students with a profound loss of skills development. Such skill losses are likely to have a significant negative economic impact in the long run, reflected not only in lower productivity but also in lower innovation, and expected individual income and GDP growth (Werner and Woessmann 2021). It is not only research data that estimates this learning loss, but also the young people affected. According to a German study, nearly half (45%) of young people approaching high school graduation are concerned about the academic performance of quarantine education and more than a quarter are concerned about its impact on their future careers (Anger et al. 2020).

1.2. Impacts of School Closures on Social and Educational Inequalities

Studies on student achievement have specifically addressed changes in inequalities (Blaskó and Schnepf 2020), their deepening in both primary (Amuedo-Dorantes et al. 2020; Andrew et al. 2020; Maldonado and De Witte 2021) and secondary (Anger et al. 2020) education, as well as in higher education (Aucejo et al. 2020; Jaeger et al. 2021).

Most of the distance learning measures introduced in the spring of 2020, during the first school closures, were ineffective in terms of student learning (Hammerstein et al. 2021) and were also a burden for parents (Amuedo-Dorantes et al. 2020). The younger age groups (Andrew et al. 2020; Blainey et al. 2020; Blaskó and Schnepf 2020; Tomasik et al. 2020) and children from low SES families (Bacher-Hicks et al. 2021; Blainey et al. 2020; Engzell et al. 2021; Blaskó and Schnepf 2020; Maldonado and De Witte 2021) were the most negatively affected by school closures associated with COVID-19. This finding is also in line with predictions of widening learning gaps and cumulative learning losses in later school years (Grewenig et al. 2020; Haack and Lefebvre 2020; Kaffenberger 2021; Pensiero et al. 2020).

There are several reasons for the widening of inequalities, which can be grouped mainly around home circumstances, peer presence and the reactions of parents, teachers and school.

The conditions for the transition to online education have been mainly manifested in a lack of technical equipment (Bacher-Hicks et al. 2021; Blaskó and Schnepf 2020) and differences in its quality (Andrew et al. 2020), but also in the absence of age-appropriate

reading material (Blaskó and Schnepf 2020) and inadequate learning environments, as poorer families are even less likely to be able to provide a quiet room for their children to learn when the whole family is at home (Blaskó and Schnepf 2020). A study by Andrew et al. (2020) shows considerable heterogeneity in children's learning experiences during school closures, in terms of the amount of time spent learning, the activities undertaken during this time, and the availability of resources to support learning—heterogeneity is highly correlated with families' financial situation. In some cases, this correlation is even stronger than before the closures, adding that this increasing inequality was not only related to home circumstances but also to the different resources provided by schools.

Inequalities in academic achievement are also linked to the lack of peer presence, as children of low-status parents miss out on stimulating peer influences. Meanwhile the lack of social interaction due to quarantine periods can also be psychologically stressful for children and can also affect their learning processes (Maldonado and De Witte 2021).

Parents' educational attainment also has a big impact on children's success in home learning, as, unlike highly-educated parents, poorly-educated parents are not able to help children learn at home. Nevertheless, Bansak and Starr's (2021) research suggests that, in the American families they studied, parents with lower education did not spend less time helping their children learn at home than higher-educated parents, but appeared to have more problems with internet access and computer use. Grewenig et al. (2020) found that, on average, students' time spent learning decreased, which was more pronounced for lower-achieving children, but was not excessive for children of low-educated parents, based on their findings.

Thus, during lockdown, there were greater differences in children's learning time, particularly for ISCED-1 children, who have a more consistent learning time in the school environment, which, consequently, promotes equality (Andrew et al. 2020). Teacher-led, live-mediated lessons not only increased the amount of independent task completion by children, but also the amount of time parents spent helping their children learn (Bansak and Starr 2021). Thus, ongoing contact between teachers, parents and students during school closures was crucial (OECD 2021), with regular monitoring by teachers supporting children to deepen their learning (Huber and Helm 2020). A study by Grewenig et al. (2020) found that during lockdown teaching the gap widened most between otherwise lower-achieving children and their higher-achieving peers, as self-regulated learning was even more necessary in this environment than when the teacher delivered the lessons in person, and this presented a huge challenge for lower-achieving children.

Overall, research on education in the COVID-19 pandemic suggests that children from the poorest backgrounds experience very high levels of skill loss, while those from the richest backgrounds experience much lower loss levels (Engzell et al. 2021; Maldonado and De Witte 2021), further deepening social inequalities, hindering social mobility, and having severe economic consequences at both micro and macro levels.

1.3. The Hungarian Context

In Hungary, a complete school closure took place from March 2020, with education continuing outside the classroom in an e-learning work schedule. The announced on-line/digital distance learning ended in mid-May 2020, essentially lasting for the entire spring semester of the 2019/2020 school year. There have been no further complete closures in primary education, but partial closures took place later as the pandemic spread.

There are two features in the Hungarian education system that should definitely be taken into account in the aftermath of the COVID-19 pandemic. Firstly, the high rate of early school leavers, an indicator that has remained significantly stable in Hungary over the last 20 years, while the EU average has been steadily decreasing. According to Eurostat (2022), the rate of early school leavers in Hungary was 12.1% in 2020. Only five EU member states (Spain, Romania, Italy, Bulgaria and Malta) had a worse rate, but unlike Hungary, these countries have seen a significant improvement over the last two decades. The other feature is the strong impact of family background on educational effectiveness. Based on the results

of the Organisation for Economic Co-operation and Development's (OECD) Programme for International Student Assessment (PISA), it can be concluded that, compared with developed countries, the SES index of a student in Hungary is a strong explanatory factor for academic achievement, with no change over two decades (OECD 2022). Data from the Hungarian National Assessment of Basic Competences (NABC) further nuance this picture: this explanatory power increases as the learning path progresses (between grades 6, 8 and 10), i.e., the Hungarian education system strengthens the impact of family background.

In Hungary, there are no comprehensive data as yet on the extent of learning loss in public education. Conducted annually since 2003, the NABC in reading comprehension and mathematical literacy was cancelled in 2020 as a result of the pandemic-related school closures, and the data for 2021 are not yet available at the time of writing this paper. Thus, we can rely mainly on projections from previous research.

Blaskó et al. (2021) used data from the 2019 International Association for the Evaluation of Educational Achievement's (IEA) Trends in International Mathematics and Science Study (TIMSS) for fourth graders to predict the likely impact of COVID-19 on widening inequalities in 22 European countries, including Hungary. The analysis focused on the most vulnerable groups, with a focus on material conditions at home and parental support as the factors most influencing the period of distance learning. The researchers hypothesise that countries that fail to compensate for inequalities in parental background in their education systems will be less likely to cope with the increasing importance of these factors during a pandemic. The results show that educational inequalities within and between countries are likely to increase significantly across Europe. The analysis concludes that Bulgaria, Germany, Slovakia, Hungary and Malta are likely to face significant falls in average performance and increases in inequalities. This will be even more pronounced for Bulgaria, Hungary and Malta, as the duration of school closure was longer in these three countries.

Lannert and Varga (2022) estimated the impact of the COVID-19 pandemic on academic achievement in 11 Eastern European countries, including Hungary, using data from PISA 2018. Taking into account the length of school closures, they modelled four different scenarios assuming different levels of effectiveness of distance teaching and learning. In the first two models, differences by SES were not taken into account, while in the second two models it was also taken into account that students with different family backgrounds may use distance learning methods with different effectiveness. The estimated results show huge learning losses in all the countries studied. Even in the best-case scenario, students suffered on average almost one year of learning loss. The worst-case scenario predicts losses two- or even three-times higher (varying by country). The authors also point out that the pandemic has not only increased existing inequalities but has also disrupted the development paths of previously more successful countries (Estonia, Poland and Slovenia). Furthermore, they point out that the learning losses caused by school closures will not only be reflected in test scores but could also lead to a surge in the number of early school leavers.

1.4. Research Questions

A fundamental question is how students have adapted to the changed teaching-learning conditions caused by school closures and how they perceive the effects on their learning processes. This analysis seeks to answer the following questions:

RQ1. How do learners perceive the online/digital distance learning implemented during the second semester of the 2019/2020 school year, with special regard to the learning difficulties experienced and the changes in the time spent on learning?

RQ2. What are the individual, family or school-related characteristics that differentiate students' opinions?

2. Materials and Methods

2.1. Survey Method and Respondents

Our analyses are based on the results of an online survey of students in the framework of a complex research project on early school leaving in Hungary (for more information on the research see [Fehérvári et al. 2020, 2021](#)).

The research project was carried out in five of Hungary's 19 counties (Vas, Zala, Győr-Moson-Sopron, Borsod-Abaúj-Zemplén and Veszprém) and Budapest. The schools participating in the project were selected on the basis of the proportion of students at risk of dropping out, collected by the early warning system that was introduced nationwide in 2016. The early warning system aims to collect data on students at risk of dropping out that will provide a basis for schools for intervention and support. The early warning system includes an index for primary school students in grades 5–8, based on a number of elementary variables, both by grade and collectively, which shows the proportion of students at risk of dropping out at school level. The target group of the research project was the seventh-grade students of the selected schools, i.e., 5975 pupils from 159 schools. A total of 3251 seventh-graders from 117 schools participated in the student survey (return rate: 54.4%). The sample was reduced by the lack of response to the questions in the focus of the analysis. Thus, the sample analysed in our study consisted of responses from 3222 pupils. The sample cannot be considered representative due to the purpose of the broader context of the complex research project (to study schools most affected by dropout in certain areas), however, the gender distribution of the sample matches the gender distribution of students in schools in the study areas (binomial test: $p = 0.12$).

The data used as a basis for the analyses were collected using the self-administered CAWI surveying technique. The data collection took place in the first semester of the 2020/2021 school year, i.e., in the autumn of 2020. The questionnaires were completed on a voluntary and anonymous basis, subject to the ethical approval of the research site.

2.2. (Dependent) Variables Measuring Perceptions of Online/Digital Distance Learning

In line with the aim of our research, this paper is focused on the analysis of three questions in the student questionnaire: (1) Did you feel that learning was easier or more difficult than usual for you during the online/digital distance learning at the end of the previous school year? (2) Did you feel that you spent less or more time than usual on learning during the online/digital distance learning at the end of the previous school year? (3) How difficult was it for you to complete or prepare the assignments you were given during the online/digital distance learning period? Each of the three questions was measured on a five-grade scale (in order: 1 = it was much easier for me to learn/I spent much less time learning/I had no difficulty at all; 5 = it was much harder for me to learn/I spent much more time learning/it was very difficult). Based on the questions, non-hierarchical K-means cluster analysis was used to create clearly differentiated groups that illustrate learners' differing perceptions of online/digital distance learning. Clustering was performed using standardised forms of the responses to the three questions (mean: 0 and standard deviation: 1). In this way, four clusters were identified in the student sample: (1) 'Easy adapters' were students who found the learning process easier than in traditional teaching settings, experienced fewer difficulties, while spending less time on learning; (2) 'Compensating with more time input' were those who found it easier to learn, experienced fewer difficulties, but also spent more time on learning; (3) 'Struggling but coping' were students who found it harder to learn, experienced more difficulties, but nevertheless, or because of this, spent more time on learning; and (4) the group 'Resigned' included those who found it harder to learn and experienced more difficulties while spending less time on learning. The cluster centres were significantly different along the clustering variables ($p < 0.001$). The validity of clustering was also tested by cluster analyses started from different initial centre.

2.3. Individual Background Characteristics

In the student groups with differing perceptions of online/digital distance learning, we examined differences by gender (boys, girls), health status, and commitment to learning and school. Health status was examined in terms of physical and psychological health. Physical health was measured by self-rated health status (poor, fair, good, excellent) (Cavallo et al. 2015) and the prevalence (none/existing) of a chronic non-communicable disease (e.g., diabetes, arthritis, allergies, birth injury) diagnosed by a doctor. Mental health was analysed using overall satisfaction with life as measured by the Cantril ladder (Cantril 1966) (0 = worst possible life; 10 = best possible life) and Rosenberg Self-Esteem Scale (Rosenberg 1965) (0–30). In addition, the students' level of confidence in themselves and in their future (0 = not at all confident; 10 = completely confident) was also assessed.

2.4. Family Background Characteristics

The student groups were also compared by place of residence (capital, county seat, other town, or village), family structure (two-parent or non-two-parent family and number of siblings); exposure to deviance, economic, relational and cultural resources, and attitude to school/study. The prevalence of deviant patterns within the family was measured by an indicator of the number of deviant/risky behavioural patterns in the family (smoking, regular alcohol consumption, family member in prison, and tranquillisers/sleeping pills use). Other parameters included the family's economic, social and cultural resources, ethnicity, and living conditions: long-term illness of close family members (none/yes); the highest level of education of the parents (primary school, secondary school without GCE, secondary school with GCE, and higher education graduation); stability of the parents' labour market position (both parents with unstable labour market position, i.e., no permanent job or own business, and mother and/or father with a stable labour market position); and whether either parent was of Gypsy origin (no/yes). In addition, an index was created to express home learning conditions, summarising the existence (none/yes) of their own room, own smartphone, own computer/laptop/tablet and internet access at home. On the resulting four-point scale (0 to 4), we considered as deprived those students who lacked any of the listed living conditions components, i.e., had a score of less than 4. Parental/family attitudes to school and learning were measured by seven variables whose information content was condensed into a principal component (explained variance 47.9%; Cronbach's $\alpha = 0.695$). We also examined whether parents supported their children more, to the same extent or to a lesser extent in home learning during the period of online/digital distance learning. Two questions were used to create the variable, each of which respondents could answer on a five-point scale (1 = not at all; 5 = completely). One question measured the extent to which parents generally supported the student in home learning, and the other question measured the extent to which they supported the student during the online/digital distance learning period at the end of the 2020/2021 school year. In addition, we also asked how much the students trust their parents (0 = not at all; 10 = completely); and whether they go to private tutoring (i.e., participate in shadow education) (no/yes), which may indicate the family's commitment to learning as well as their financial capabilities.

2.5. Characteristics Related to School Life

In the context of school life, firstly, we examined engagement in learning and school as measured by school performance (end-of-year GPA in grade 6), the degree of liking for the most preferred subject (1 = not at all; 5 = very much), the school/learning utility index (an indicator generated from seven variables using principal component analysis (PCA) and explaining 46.6% of the variance of the variables included; Cronbach's $\alpha = 0.804$), and the achievement-oriented learning index (an indicator generated by PCA from four variables which explained a variance of 49.6%; Cronbach's $\alpha = 0.653$). Secondly, we examined the level of trust in classmates and schoolmates (0 = not at all; 10 = completely), and the quality of the relationship with classmates and schoolmates. This was measured by the school

peer relations index generated from seven variables using PCA (explained variance 60.3%; Cronbach's $\alpha = 0.889$). Thirdly, we examined students' perceptions of their school and their teachers. Teachers' attitudes towards students, their helpfulness, and the quality of teacher–student relationships were measured by the teacher support index, which was generated from ten variables by PCA (explained variance 59%; Cronbach's $\alpha = 0.920$). We also measured the teacher–student relationship by means of the level of trust in teachers (0 = not at all; 10 = completely). School climate was also measured using an index created by PCA summarising the information content of seven variables (explained variance 51%; Cronbach's $\alpha = 0.830$). In addition, we also used a principal component index of three variables to examine students' perceptions of the quality of education and the school's expectations (explained variance 64.4%; Cronbach's $\alpha = 0.723$).

2.6. Analysis Procedure

In addition to the non-hierarchical K-means cluster analysis used to create the learner groups studied and the PCA used to create some aggregate indexes, we applied descriptive statistical methods to analyse the patterns differing in terms of individual, family and school life variables in the student groups having different perceptions of online/digital distance learning. To identify significant differences in low (nominal or ordinal) measurement level variables (e.g., gender, residence, and parental education), a Chi-square test was used (examining both the adjusted standardised residuals and the Phi or Cramer's V effect size coefficients). A one-way ANOVA test was used for high measurement level variables (e.g., Rosenberg Self-Esteem Scale, life satisfaction, and generated principal components). Differences between the mean scores of the student groups were tested using a Bonferroni post-hoc procedure and the Eta-square as an effect size indicator was also calculated. For all statistical analyses, the significance level was set at $p < 0.05$. In all cases, the indexes obtained from PCA were converted to a scale of 0–100.

3. Results

3.1. Students' Perception of Online/Digital Distance Learning

Almost two-fifths (38.5%) of the students in the sample surveyed found it easier to adapt to the online/digital distance learning environment ('Easy adapters'), i.e., they reported fewer difficulties in learning and less time spent on learning. More than a fifth of students (22.2%) also rated the learning process easier but spent significantly more time on learning compared to traditional learning settings ('Compensating with more time input'). More than a tenth of students (12.2%) experienced difficulties by spending more time studying ('Struggling but coping'), while more than a quarter (27.1%) said they spent less time studying ('Resigned').

Examination of the student groups by individual, family and school-related background characteristics clearly highlights the differences between the groups, with significant differences in terms of almost all of the background characteristics examined. Adding to this, the effect size indicators (Phi or Cramer's V coefficients, and Eta-square) all indicate small effect sizes (Cohen 1988). No significant differences ($p > 0.05$) were found in the case of one individual characteristic (presence of a chronic non-communicable disease diagnosed by a doctor), one family-related characteristic (trust in parents) and two school-related characteristics (school peer relations index and trust in school peers) (see Tables 1–3).

Table 1. Distributions by individual background characteristics in learner groups having different perceptions of online/digital distance learning.

Characteristics	Total Sample	Easy Adapters	Compensating with More Time Input	Struggling But Coping	Resigned	χ^2	Φ
Gender						38.68 ***	0.110
n	3222	1240	716	394	872		
% boy	49.4	56.2 (6.1)	46.9 (1.5)	42.9 (2.8)	44.8 (3.2)		
% girl	50.6	43.8 (−6.1)	53.1 (−1.5)	57.1 (−2.8)	55.2 (−3.2)		
Self-rated health status						31.33 ***	0.058
n	3078	1194	678	378	828		
% poor	2.2	1.5 (−1.9)	2.2 (0.2)	1.6 (−0.8)	3.1 (2.4)		
% adequate	15.0	13.4 (−2.0)	13.9 (−1.0)	18.5 (2.0)	16.8 (1.6)		
% good	47.3	46.2 (−0.9)	45.3 (−1.2)	47.6 (0.1)	50.4 (2.1)		
% excellent	35.5	38.9 (3.1)	38.6 (1.9)	32.3 (−1.4)	29.7 (−4.1)		
Chronic non-communicable disease diagnosed by a doctor						2.91	–
n	3057	1187	676	373	821		
% none	78.3	79.5 (1.3)	76.9 (−1.0)	76.1 (−1.1)	78.7 (0.3)		
% yes	21.7	20.5 (−1.3)	23.1 (1.0)	23.9 (1.1)	21.3 (−0.3)		

Note: The student groups were compared by means of a Chi-square test. Adjusted standardised residuals are in brackets. Φ = effect size (Phi or Cramer's V coefficients). *** $p < 0.001$.

Table 2. Means, standard deviation and one-way ANOVA by individual background characteristics.

Characteristics	Easy Adapters			Compensating with More Time Input			Struggling But Coping			Resigned			$F(3, 3026-3059)$	η^2
	N	M	SD	N	M	SD	N	M	SD	N	M	SD		
Rosenberg Self-Esteem Scale ^a	1190	18.75 _x	5.84	678	17.72 _y	6.15	374	17.29 _y	6.08	817	17.21 _y	5.86	13.21 ***	0.013
Overall satisfaction ^b	1187	7.86 _x	1.96	678	7.84 _{xy}	2.08	376	7.50 _{yz}	2.15	822	7.51 _z	2.05	6.94 ***	0.007
Confidence in self ^b	1185	8.13 _x	2.67	669	8.00 _x	2.64	365	7.95 _{xy}	2.87	822	7.59 _y	3.06	6.23 ***	0.006
Confidence in future ^b	1179	8.13 _x	2.39	668	8.19 _x	2.20	367	8.03 _{xy}	2.52	816	7.77 _y	2.52	4.79 **	0.005

Note: M = mean. SD = standard deviation. η^2 = effect size (Eta-square). There is a significant difference in means in the same row but with differing indexes (Bonferroni post-hoc test, $p < 0.05$). ^a Scale of 0–30. ^b Scale of 0–10. ** $p < 0.01$. *** $p < 0.001$.

Table 3. Distributions by family background characteristics in learner groups having different perceptions of online/digital distance learning.

Characteristics	Total Sample	Easy Adapters	Compensating with More Time Input	Struggling But Coping	Resigned	χ^2	Φ
Residence						51.55 ***	0.073
n	3222	1039	638	384	891		
% capital	40.6	42.9 (2.1)	42.7 (1.3)	40.9 (0.1)	35.6 (−3.6)		
% county seat	11.9	14.9 (4.2)	10.1 (−1.7)	8.1 (−2.5)	10.9 (−1.1)		
% other town	19.8	20.2 (0.4)	18.2 (−1.3)	19.8 (0.0)	20.6 (0.7)		
% village	27.7	22.0 (−5.7)	29.0 (0.9)	31.2 (1.7)	32.9 (4.1)		
Family structure						9.54 *	0.054
n	2912	1143	648	350	771		
% two-parent family	80.9	83.2 (2.5)	81.3 (0.3)	78.0 (−1.5)	78.6 (−1.9)		
% non-two-parent family	19.1	16.8 (−2.5)	18.7 (−0.3)	22.0 (1.5)	20.4 (1.9)		
Family member with long-term illness						8.29 *	0.053
n	2901	1140	645	349	767		
% none	82.6	84.4 (2.0)	83.9 (0.9)	79.4 (−1.7)	80.4 (−1.9)		
% yes	17.4	15.6 (−2.0)	16.1 (−0.9)	20.6 (1.7)	19.6 (1.9)		
Parents' highest level of education						45.21 ***	0.080
n	2330	929	498	278	625		
% primary school	7.3	5.6 (−2.4)	6.2 (−1.0)	9.0 (1.2)	9.8 (2.8)		
% secondary education without GCE	11.6	8.0 (−4.5)	13.1 (1.1)	14.4 (1.5)	14.7 (2.8)		
% secondary education with GCE	25.5	24.9 (−0.5)	23.3 (−1.2)	28.4 (1.2)	26.7 (0.9)		
% higher education degree	55.6	61.5 (4.6)	57.4 (0.9)	48.2 (−2.7)	48.8 (−4.0)		
Parents' labour market status						14.18 **	0.072
n	2764	1088	611	333	732		
% parents with unstable position	3.5	2.1 (−3.2)	3.3 (−0.4)	5.4 (2.0)	4.9 (2.4)		
% mother and/or father with stable position	96.5	97.9 (3.2)	96.7 (0.4)	94.6 (−2.0)	95.1 (−2.4)		
One or both parents of Gypsy ethnicity						23.52 ***	0.085
n	3222	1240	716	394	872		
% no	91.3	93.9 (4.0)	91.9 (0.6)	87.6 (−2.8)	89.0 (−2.9)		
% yes	8.7	6.1 (−4.0)	8.1 (−0.6)	12.4 (2.8)	11.0 (2.9)		
Deprivation in home learning conditions						10.95 *	0.062
n	2888	1135	640	348	765		
% no	93.9	95.1 (2.2)	94.5 (0.8)	90.5 (−2.9)	93.1 (−1.0)		
% yes	6.1	4.9 (−2.2)	5.5 (−0.8)	9.5 (2.9)	6.9 (1.0)		
Private tutoring (shadow education)						10.68 *	0.058
n	3217	1240	712	394	871		
% no	76.5	73.6 (−3.0)	77.1 (0.4)	77.7 (0.6)	79.6 (2.5)		
% yes	23.5	26.4 (3.0)	22.9 (−0.4)	22.3 (−0.6)	20.4 (−2.5)		
Change in parental support at the time of online/digital distance learning						18.25 **	0.054
n	3181	1227	705	386	863		
% generally more support	13.7	13.9 (0.2)	11.2 (−2.2)	12.7 (−0.6)	15.9 (2.2)		
% no change in support	72.6	74.8 (2.2)	73.3 (0.5)	70.5 (−1.0)	69.8 (−2.2)		
% more support during online/digital distance learning	13.7	11.3 (−3.1)	15.5 (1.5)	16.8 (1.9)	14.3 (0.6)		

Note: The student groups were compared by means of a Chi-square test. Adjusted standardised residuals are in brackets. Φ = effect size (Phi or Cramer's V coefficients). * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

3.2. Differences by Individual Background Characteristics

There are significant differences between the student groups regarding the individual background characteristics of gender, subjective physical and mental health indicators, and confidence in self and in the future (see Tables 1 and 2). Only the 'Easy adapters' group shows a significant male predominance compared with the other groups, while girls are in the majority in the other groups, and girls are significantly overrepresented in the two groups having difficulties ('Struggling but coping' and 'Resigned'). The 'Easy adapters' group also has the best perceived health, the highest self-esteem and highest level of satisfaction and confidence in itself and its future. In this respect, 'Compensators with more time input' follow a similar pattern, with one notable exception being their lower average score on the self-esteem scale. Similarly, the 'Struggling but coping' group has a lower self-esteem, but also a lower overall sense of satisfaction and a slightly worse perception of its health. In terms of physical and mental health, the worst indicators are for the 'Resigned', adding that significant differences are only evident in relation to the two groups that face fewer difficulties ('Easy adapters' and 'Compensating with more time input').

3.3. Differences by Family Background Characteristics

Looking at the differences between the student groups regarding family background characteristics, clear disparities emerge in terms of residence, number of siblings, number of deviant patterns in the family, as well as the family's socio-economic background, and attitudes to school/learning (see Tables 3 and 4). 'Easy adapters' are overrepresented in cities and larger towns and underrepresented in villages, while the opposite is true for the 'Resigned' group. The other two groups do not show such sharp differences in the distribution by location of residence. In general, students in the two groups with fewer difficulties are more likely to live in two-parent families and have fewer siblings on average, are less likely to have a persistent illness or deviant patterns in their family; they are less likely to have parents of Gypsy origin, and more likely to have parents with higher education and a stable labour market status than the two groups with difficulties. In terms of home learning conditions, 'Easy adapters' are in the best position, while 'Struggling but coping' are in the least favourable position. The other two groups form an intermediate category in this respect, with the addition that the 'Resigned' have slightly less favourable conditions than the 'Compensators with more time input'. Private tutors are also most affordable for the 'Easy adapters' and least affordable for the 'Resigned'. The level of parental support is also highest among the 'Easy adapters' and lowest among the 'Resigned'. Looking at parental support during the online learning period, we found that 'Easy adapters' received support from their parents in their studies essentially with the usual intensity, while members of the 'Resigned' group tended to report that their parents had been able or more willing to support them before the school closures due to the epidemic. As regards the two other groups, it is important to highlight that it is in these groups where we had the highest proportion of students whose parents were more supportive than usual during the online learning period.

Table 4. Means, standard deviation and one-way ANOVA by family background characteristics.

Characteristics	Easy Adapters			Compensating with More Time Input			Struggling But Coping			Resigned			F(3, 2877–3078)	η^2
	N	M	SD	N	M	SD	N	M	SD	N	M	SD		
Number of siblings	1137	1.55 _x	1.55	643	1.61 _{xy}	1.51	345	1.94 _z	1.91	756	1.75 _{yz}	1.60	6.37 ***	0.007
Deviance patterns ^a	1155	0.55 _x	0.72	647	0.56 _x	0.70	354	0.64 _{xy}	0.78	780	0.67 _y	0.80	4.98 **	0.005
Parental/family support index ^b	1189	84.63 _x	15.47	664	84.09 _{xy}	15.76	365	83.26 _{xy}	16.35	825	82.02 _y	16.35	4.63 **	0.005
Trust in parent ^c	1204	9.38	1.55	675	9.44	1.36	371	9.27	1.83	832	9.30	1.67	1.47	–

Note: M = mean. SD = standard deviation. η^2 = effect size (Eta-square). There is a significant difference in means in the same row but with differing indexes (Bonferroni post-hoc test, $p < 0.05$). ^a Scale of 0–4. ^b Scale of 0–100. ^c Scale of 0–10. ** $p < 0.01$. *** $p < 0.001$.

3.4. Differences by School Life-Related Characteristics

In terms of the characteristics of school life, here again there are features that clearly distinguish the groups. Examining the indicators measuring learning/school engagement shows that ‘Easy adapters’ appear markedly different from the others. Their academic average stands out from among the other groups. However, they achieve this higher academic performance while rating the usefulness of school/learning—i.e., the importance of learning and the usefulness of the knowledge that school provides for later life—significantly lower than the other groups. There are no significant differences between ‘Struggling but coping’ and ‘Compensators with more time input’ as well as between ‘Struggling but coping’ and ‘Resigned’ groups in all indicators of the characteristics of school life. However, the level of liking of the favourite subject and the achievement-oriented learning index are significantly lower in the ‘Resigned’ group than among the ‘Compensators with more time input’. In contrast to parental support, the level of teacher support is perceived to be lowest by ‘Easy adapters’, and the same is true for their perception of trust in teachers, the atmosphere in their school, and the quality of education. There is no significant difference between the other three groups in terms of these indicators. In addition, a significant difference from the ‘Easy adapters’ group can be found mainly with respect to the ‘Compensating with more time input’ group, which has the most favourable value judgements (see Table 5).

Table 5. Means, standard deviation and one-way ANOVA by school life-related background characteristics.

Characteristics	Easy Adapters			Compensating with More Time Input			Struggling But Coping			Resigned			F (3, 2877–3199)	η^2
	N	M	SD	N	M	SD	N	M	SD	N	M	SD		
Grade 6 GPA ^a	1236	4.24 _x	0.66	713	4.15 _y	0.68	392	4.09 _y	0.74	862	4.09 _y	0.69	10.11 ***	0.009
Liking for most preferred subject ^a	1228	4.56 _x	0.70	705	4.55 _x	0.72	385	4.54 _{xy}	0.68	866	4.44 _y	0.75	5.41 **	0.005
School/learning utility index ^b	1175	66.55 _x	19.32	656	72.02 _y	19.10	362	71.54 _y	20.6	814	69.92 _y	18.39	14.48 ***	0.014
Achievement-oriented learning index ^b	1184	69.23 _{xy}	19.54	669	70.94 _x	18.67	372	70.43 _{xy}	19.20	828	67.40 _y	19.16	4.79 **	0.005
Teacher support index ^b	1130	59.98 _x	22.23	632	64.42 _y	22.71	346	63.25 _{xy}	33.74	773	63.10 _y	21.08	6.52 ***	0.007
Trust in teachers ^c	1179	6.22 _x	3.02	673	6.70 _y	2.90	373	6.73 _y	3.09	829	6.41 _{xy}	2.84	5.18 **	0.005
School climate index ^b	1153	61.28 _x	20.66	652	65.43 _y	20.31	352	63.58 _{xy}	21.01	784	63.38 _{xy}	19.92	5.97 ***	0.006
Quality of education index ^b	1170	68.63 _x	20.95	673	71.49 _y	18.12	366	70.72 _{xy}	19.25	806	69.33 _{xy}	20.52	2.66 *	0.003
Peer relations index ^b	1156	74.95	21.25	646	74.41	21.86	361	71.94	23.71	811	74.10	20.81	1.81	–
Trust in school peers ^c	1200	6.38	2.68	674	6.43	2.67	369	6.41	2.85	827	6.28	2.61	0.46	–

Note: M = mean. SD = standard deviation. η^2 = effect size (Eta-square). There is a significant difference in means in the same row but with differing indexes (Bonferroni post-hoc test, $p < 0.05$). ^a Scale of 1–5. ^b Scale of 0–100. ^c Scale of 0–10. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

3.5. Main Differences between the Student Groups

Table 6 summarises the differences between groups by individual, family and school factors.

Table 6. Main differences between the student groups by individual, family and school characteristics.

Easy Adapters	Compensating with More Time Input	Struggling But Coping	Resigned
Individual characteristics			
significant overrepresentation of boys	overrepresentation of girls	significant overrepresentation of girls	
best physical and mental health	better than average physical and mental health	worse than average physical and mental health	worst physical and mental health
outstanding self-esteem	below average self-esteem		
above average satisfaction		below average satisfaction	
above average level of trust		average level of trust	lowest average level of trust
Family characteristics			
overrepresented in cities and towns	(no overrepresentation by place of residence)		overrepresented in villages
more likely to live in two-parent families and less likelihood of deviance patterns and permanent illness in the family		less likely to live in two-parent families and more likelihood of deviance patterns and permanent illness in the family	
parents have highest levels of education and most stable labour market status	parents are more educated and have stable labour market status	parents are less educated and have unstable labour market status	
fewer siblings		most siblings	more siblings
Roma ethnicity least typical	Roma ethnicity less typical	Roma ethnicity most typical	
least deprived regarding home learning conditions	average home learning conditions	most deprived regarding home learning conditions	average home learning conditions
participation in shadow education most typical	average participation in shadow education		participation in shadow education is least typical
strongest parental support	strong parental support	strong parental support	least parental support
School life characteristics			
highest GPA	good GPA	lowest GPA	
stronger achievement-orientedness and liking for a subject			less strong achievement-orientedness and liking for a subject
most negative perception of school and teachers	most positive perception of school and teachers	positive perception of school and teachers	rather positive perception of school and teachers

4. Discussion

Our analysis investigated the views and experiences of students with regard to on-line/digital distance learning in schools most affected by early school leaving. Previous research has shown that school closures due to the COVID-19 pandemic and the subsequent transition to online/digital education negatively affected student performance (Maldonado and De Witte 2021; Hammerstein et al. 2021). Research also highlights that it is mostly students with a low SES index who experienced the greatest learning loss, leading to deepening educational inequalities (Blaskó et al. 2021; Engzell et al. 2021; Lannert and Varga 2022; Maldonado and De Witte 2021).

Similar to the findings of Andrew et al. (2020), our study suggests that students in schools at risk of dropout do not form a homogeneous group; rather, they present different patterns of coping with the changed teaching-learning situation caused by the pandemic based on individual, family and school factors. Four groups were identified on the basis of perceptions of the learning process, difficulties experienced and time spent on learning: the 'Easy adapters' and 'Compensating with more time input' groups perceived the process of distance learning as easier and faced fewer obstacles, but while the former group adapted to the new situation with less time input, the latter group invested more time in learning during the digital education period. The other two groups experienced the learning process to be more difficult and encountered more obstacles, but while 'Struggling but coping' tried to overcome their learning difficulties by spending more time and thus still managed to cope, the 'Resigned' spent significantly less time learning.

Our results show fundamental differences between the groups that did and did not have difficulties. Looking at individual characteristics, members of the two groups reporting fewer difficulties have a better sense of physical and mental health and overall satisfaction, and stronger confidence in themselves and their future than the groups experiencing difficulties. The family background variables show that the two groups reporting fewer difficulties had better backgrounds, with intact families, fewer siblings, better educated parents, and who had stable employment backgrounds. Conversely, the other two groups with more learning obstacles are more likely to have had a single-parent family with more siblings, and more frequent parental deviance, persistent illness, lower educational attainment, and unstable labour market backgrounds. Roma ethnicity is also more common in these groups. As regards school life, the two groups with fewer difficulties have a higher GPA than the other two groups.

There is a particularly sharp divide between the 'Easy adapters' and the 'Resigned' groups: the former shows the most favourable and the latter the least favourable picture for most of the characteristics examined. 'Easy adapters' differ from the other groups only in their less favourable perception of their school (climate, quality, usefulness) and their teachers (support from teachers, trust in teachers), i.e., in their case, easier adaptation and better academic performance are less related to school and more to the supportive environment and the financial and cultural resources of the family. A good example is that, while they are the most averse to school, they are the most likely to use the services provided by shadow education, which reflects their families' financial capabilities and commitment to learning. The latter is confirmed by the high level of parental support. In contrast, the 'Resigned' have the lowest levels of participation in shadow education and the lowest levels of parental support. In addition, it is the only group characterised by less achievement orientation and less motivation to learn.

Examination of parental support, home circumstances and perceptions of school and teachers reveals important patterns. Children coming from highly favourable family backgrounds and with very strong parental support adapted more easily to their changed learning circumstances despite feeling the least support from the school and teachers ('Easy adapters'), while students who perceived greater school and teacher support but have less favourable family backgrounds and little parental support tended to resign themselves to their learning difficulties ('Resigned'). In addition, there were children with more favourable family backgrounds who, with strong parental support and outstanding

support from their school and teachers, spent more time on learning and overcame obstacles more easily ('Compensating with more time input'). There was also a group ('Struggling but coping') who also received a lot of support from their parents, school and teachers, spent more time studying, but still had difficulties, which may have been due to the less favourable conditions of home learning (many siblings, no private room, no smartphone, computer and/or internet access at home).

Although the main dividing line is between the two groups facing difficulties and the two groups having fewer difficulties, there are several factors that point to distinctions of a different nature. One such factor among the individual characteristics, is gender. It can be clearly seen that boys, at least in their own perception, adapted more easily to distance learning than girls (in the other three groups there is a clear predominance of girls). Gender differences in ICT skills, digital attitudes and motivation, where boys have an advantage over girls (see [Vekiri and Chronaki 2008](#)), may play a role in this, as well as the fact that girls tend to require more social support and teacher–student interaction than boys ([Frymier and Houser 2000](#); [Tamres et al. 2002](#)), especially in difficult and stressful situations such as those caused by the COVID-19 pandemic. Whether changes in family background increase or decrease student achievement gaps depends to a large extent on which family background variable is considered the most critical. Such critical family background variables can be family income and wealth, family structure, parents' education, health, or well-being. The precise impact of the changes in family factors is unclear ([Hanushek et al. 2022](#)). In our study, we highlighted the role of financial background and family structure. Among the family background factors, the number of siblings and the conditions of home learning leave 'Struggling but coping' with the most detrimental learning conditions (unfavourable financial background, lack of home learning resources, large family, etc.). As regards the characteristics of school life, the perception of the school and its teachers can be considered a factor that presents a slightly different picture compared with the previous characteristics, as 'Compensators with more time input' gave the highest ratings in this respect.

Importantly, we found no significant differences between the groups in terms of school peer relationships and trust in classmates/schoolmates, which suggests that adaptation to the changed learning processes due to the pandemic occurred independently from these factors (cf. [Maldonado and De Witte 2021](#)).

Limitations

Sampling was based on availability, and we analysed schools in particular regions where students at risk of dropping out are overrepresented. Consequently, the sample cannot be considered representative and the findings and conclusions derived from our analyses only refer to the students involved. Nevertheless, in our professional opinion, the sample fits our research goals, i.e., it is suitable for exploring differences between student responses and learning patterns to online/digital distance learning introduced due to the COVID-19 pandemic among students at risk of dropping out.

Another limitation is that the survey was self-reported, i.e., our findings are based solely on student perceptions and opinions, which may also bias our results. Thus, our analysis does not include school background variables and the different types of actual learning environments provided by schools that may enhance identified inequalities beyond the characteristics of students and their families.

Taking all of this into account, we have sought to capture the phenomenon in a complex way, by exploring the internal structure of disadvantaged groups of pupils through a multi-perspective study.

5. Conclusions

Our findings highlight that students have not responded in the same way to the changes in learning processes (school closures, digital distance learning) caused by the COVID-19 pandemic. Neither the groups having difficulties nor the groups experiencing fewer difficulties are homogeneous.

During the school closures, parents, schools and teachers made efforts to support children in their learning, but there are significant differences in this respect. In line with international research findings on school closures, our research confirms the paramount importance of family and parental background in the learning process, while our research also highlights that the role of schools and teachers is less evident. Although there is a correlation between the identified groups and subjective perceptions of school, teachers and learning, this does not always translate into support to learning processes. The perception of the school's role is also tinged by the fact that peers had no influence at all on how students adapted to the changed learning process and learning environment. In addition to family background, it is individual factors that determine the extent to which a student was able to adapt and succeed in learning at the time of school closures.

Our results predict the trajectories of the subsequent school career of the groups identified. Students with a predominance of individual and family factors that impede learning are more likely to drop out than other groups. In their case, the extent of support provided by the school is therefore considerably more important.

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References

- Amuedo-Dorantes, Catalina, Miriam Marcén, Marina Morales, and Almudena Sevilla. 2020. *COVID-19 School Closures and Parental Labor Supply in the United States*. IZA Discussion Paper 13827. Bonn: Institute of Labor Economics.
- Andrew, Alison, Sarah Cattán, Monica Costa Dias, Christine Farquharson, Lucy Kraftman, Sonya Krutikova, Angus Phimister, and Almudena Sevilla. 2020. Inequalities in Children's Experiences of Home Learning During the COVID-19 Lockdown in England. *Fiscal Studies* 41: 653–83. [CrossRef] [PubMed]
- Anger, Silke, Hans Dietrich, Alexander Patzina, Malte Sandner, Adrian Lerche, Sarah Bernhard, and Carina Toussaint. 2020. School Closings during the COVID-19 Pandemic: Findings from German High School Students. *IAB-Forum*. Available online: <https://www.iab-forum.de/en/school-closings-during-the-COVID-19-pandemic-findings-from-german-high-school-students/> (accessed on 18 May 2022).
- Aucejo, Esteban M., Jacob French, Maria Paola Ugalde Araya, and Basit Zafar. 2020. *The Impact of COVID-19 on Student Experiences and Expectations: Evidence from a Survey*. NBER Working Paper 27392. Cambridge: National Bureau of Economic Research.
- Azevedo, João Pedro, Amer Hasan, Diana Goldemberg, Koen Geven, and Syedah Aroob Iqbal. 2021. Simulating the Potential Impacts of COVID-19 School Closures on Schooling and Learning Outcomes: A Set of Global Estimates. *The World Bank Research Observer* 36: 1–40.
- Bacher-Hicks, Andrew, Joshua Goodman, and Christine Mulhern. 2021. Inequality in Household Adaptation to Schooling Shocks: COVID-Induced Online Learning Engagement in Real Time. *Journal of Public Economics* 193: 104345. [CrossRef] [PubMed]
- Bansak, Cynthia, and Martha Starr. 2021. COVID-19 Shocks to Education Supply: How 200,000 U.S. Households Dealt with the Sudden Shift to Distance Learning. *Review of Economics of the Household* 19: 63–90. [CrossRef] [PubMed]

- Blainey, Katie, Charlotte Hiorns, and Timo Hannay. 2020. *The Impact of Lockdown on Children's Education: A Nationwide Analysis*. London: RS Assessment from Hodder Education and SchoolDash. Available online: https://www.risingstars-uk.com/media/Rising-Stars/Assessment/Whitepapers/RS_Assessment_white_paper_1.pdf (accessed on 18 May 2022).
- Blanden, Jo, Claire Crawford, Laura Fumagalli, and Brigitta Rabe. 2021. *School Closures and Children's Emotional and Behavioural Difficulties*. Colchester: Institute for Social and Economic Research, University of Essex. Available online: https://www.iser.essex.ac.uk/files/projects/school-closures/SDQnote2021_final.pdf (accessed on 18 May 2022).
- Blaskó, Zsuzsa, and Sylke V. Schnepf. 2020. *Educational Inequalities in Europe and Physical School Closures during Covid-19*. Fairness Policy Brief Series 04/2020; Brussels: European Commission, Joint Research Center.
- Blaskó, Zsuzsa, Patricia da Costa, and Sylke V. Schnepf. 2021. *Learning Loss and Educational Inequalities in Europe: Mapping the Potential Consequences of the COVID-19 Crisis*. IZA Discussion Paper 14298. Bonn: Institute of Labor Economics.
- Cantril, Hadley. 1966. *The Pattern of Human Concerns*. New Brunswick: Rutgers University Press.
- Cavallo, Franco, Paola Dalmasso, Veronika Ottová-Jordan, Fiona Brooks, Joanna Mazur, Raili Välimaa, Inese Gobina, Margarida Gaspar de Matos, Ulrike Raven-Sieberer, and the Positive Health Group. 2015. Trends in Self-Rated Health in European and North-American Adolescents from 2002 to 2010 in 32 Countries. *European Journal of Public Health* 25: 13–15. [CrossRef] [PubMed]
- Chetty, Ray, John N. Friedman, Nathaniel Hendren, Michael Stepner, and the Opportunity Insights Team. 2020. *How Did COVID-19 and Stabilization Policies Affect Spending and Employment? A New Real-Time Economic Tracker Based on Private Sector Data*. NBER Working Paper 27431. Cambridge: National Bureau of Economic Research.
- Cohen, Jacob. 1988. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. Hillsdale: L. Erlbaum Associates.
- Donnelly, Robin, and Harry Anthony Patrinos. 2021. Learning Loss during COVID-19: An Early Systematic Review. *Covid Economics* 77: 145–53. [CrossRef] [PubMed]
- Engzell, Per, Arun Frey, and Mark D. Verhagen. 2021. Learning Loss Due to School Closures During the COVID-19 Pandemic. *Proceedings of the National Academy of Sciences* 118: e2022376118. [CrossRef] [PubMed]
- Eurostat. 2022. Early Leavers from Education and Training by Sex and Labour Status. Available online: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=edat_lfse_14&lang=en (accessed on 18 May 2022).
- Fehérvári, Anikó, Éva Magyar, and Krisztián Széll. 2020. A tanulói lemorzsolódás empirikus vizsgálata—Elméleti és módszertani keretek [Empirical testing of school dropout—Theory and methodology frameworks]. *Iskolakultúra* 30: 3–20. [CrossRef]
- Fehérvári, Anikó, Borbála Paksi, and Krisztián Széll. 2021. Az iskolai lemorzsolódás komprehenzív vizsgálata. A kutatás elméleti, módszertani háttere [Empirical testing of a comprehensive model of school dropout. Theoretical and methodological background]. In *Számít-e az iskola? Az iskolai lemorzsolódás vizsgálata [Does School Matter? Exploring School Dropout]*. Edited by Fehérvári Anikó, Borbála Paksi and Krisztián Széll. Budapest: Eötvös Loránd Tudományegyetem, pp. 5–21.
- Frymier, Ann Bainbridge, and Marian L. Houser. 2000. The teacher student relationship as an interpersonal relationship. *Communication Education* 49: 207–19. [CrossRef]
- Grewenig, Elisabeth, Philipp Lergetporer, Katharina Werner, Ludger Woessmann, and Larissa Zierow. 2020. *COVID-19 and Educational Inequality: How School Closures Affect Low- and High-Achieving Students*. IZA Discussion Paper 13820. Bonn: Institute of Labor Economics.
- Haeck, Catherine, and Pierre Lefebvre. 2020. Pandemic school closures may increase inequality in test scores. *Canadian Public Policy* 46: 82–87. [CrossRef]
- Hamilton, Laura S., Julia H. Kaufman, and Melissa Kay Diliberti. 2020. *Teaching and Leading Through a Pandemic: Key Findings from the American Educator Panels Spring 2020 COVID-19 Surveys*. Santa Monica: RAND Corporation. Available online: https://www.rand.org/pubs/research_reports/RRA168-2.html (accessed on 18 May 2022).
- Hammerstein, Svenja, Christoph König, Thomas Dreisörner, and Andreas Frey. 2021. Effects of COVID-19-Related School Closures on Student Achievement—A Systematic Review. *Frontiers in Psychology* 12: 746289. [CrossRef] [PubMed]
- Hanushek, Eric A., Jacob D. Light, Paul E. Peterson, Laura M. Talpey, and Ludger Woessmann. 2022. *Long-Run Trends in the U.S. SES-Achievement Gap*. Available online: <http://hanushek.stanford.edu/sites/default/files/publications/SES%20paper%20final%20version.pdf> (accessed on 4 August 2022).
- Huber, Stephan Gerhard, and Christoph Helm. 2020. COVID-19 and Schooling: Evaluation, Assessment and Accountability in Times of Crises—Reacting Quickly to Explore Key Issues for Policy, Practice and Research with the School Barometer. *Educational Assessment, Evaluation and Accountability* 32: 237–70. [CrossRef] [PubMed]
- Huebener, Mathias, Sevrin Waights, C. Katharina Spiess, Nico A. Siegel, and Gert G. Wagner. 2021. Parental Well-Being in Times of COVID-19 in Germany. *Review of Economics of the Household* 19: 91–122. [CrossRef] [PubMed]
- Jaeger, David A., Jaime Arellano-Bover, Krzysztof Karbownik, Marta Martínez-Matute, John M. Nunley, Alan Seals, Mackenzie Alston, Sascha O. Becker, Pilar Beneito, René Böheim, and et al. 2021. *The Global COVID-19 Student Survey: First Wave Results*. IZA Discussion Paper 14419. Bonn: Institute of Labor Economics.
- Jakubowski, Tomasz Daniel, and Magdalena Maja Sitko-Dominik. 2021. Teachers' Mental Health During the First Two Waves of the COVID-19 Pandemic in Poland. *PLoS ONE* 16: e0257252. [CrossRef] [PubMed]
- Kaffenberger, Michelle. 2021. Modelling the Long-Run Learning Impact of the COVID-19 Learning Shock: Actions to (More than) Mitigate Loss. *International Journal of Educational Development* 81: 102326. [CrossRef] [PubMed]

- Kuhfeld, Megan, Beth Tarasawa, Angela Johnson, Erik Ruzek, and Karyn Lewis. 2020. *Learning during COVID-19: Initial Findings on Students' Reading and Math Achievement and Growth*; NWEA. Available online: https://www.ewa.org/sites/main/files/file-attachments/learning_during_covid-19_brief_nwea_nov2020_final.pdf?1606835922 (accessed on 18 May 2022).
- Lannert, Judit, and Júlia Varga. 2022. Public Education. In *Emerging European Economies after the Pandemic: Stuck in the Middle Income Trap?* Edited by Mátyás László. Cham: Springer International Publishing, pp. 465–514.
- Maldonado, Joana Elisa, and Kristof De Witte. 2021. The Effect of School Closures on Standardised Student Test Outcomes. *British Educational Research Journal* 48: 49–94. [CrossRef]
- OECD. 2021. *The State of School Education: One Year into the COVID Pandemic*. Paris: Organisation for Economic Co-operation and Development.
- OECD. 2022. *PISA Database*. Available online: <https://www.oecd.org/pisa/data/> (accessed on 18 May 2022).
- Pensiero, Nicola, Anthony Kelly, and Christian Bokhove. 2020. *Learning Inequalities during the COVID-19 Pandemic: How Families Cope with Home-Schooling*. Southampton: University of Southampton research report.
- Rosenberg, Morris. 1965. *Society and the Adolescent Self-Image*. Princeton: Princeton University Press.
- Tamres, Lisa K., Denise Janicki, and Vicki S. Helgeson. 2002. Sex differences in coping behavior: A meta-analytic review and an examination of relative coping. *Personality and Social Psychology Review* 6: 2–30. [CrossRef]
- Tomasik, Martin J., Laura A. Helbling, and Urs Moser. 2020. Educational gains of in-person vs. distance learning in primary and secondary schools: A natural experiment during the COVID-19 pandemic school closures in Switzerland. *International Journal of Psychology* 56: 566–76. [CrossRef] [PubMed]
- Vekiri, Ioanna, and Anna Chronaki. 2008. Gender issues in technology use: Perceived social support, computer self-efficacy and value beliefs, and computer use beyond school. *Computers & Education* 51: 1392–1404.
- Werner, Katharina, and Ludger Woessmann. 2021. *The Legacy of COVID-19 in Education*. CESifo Working Paper 9358. Munich: Munich Society for the Promotion of Economic Research—CESifo GmbH.
- Zierer, Klaus. 2021. Effects of Pandemic-Related School Closures on Pupils' Performance and Learning in Selected Countries: A Rapid Review. *Education Science* 11: 252. [CrossRef]