Remote Learning Readiness at the Student and School Level— Insights from PISA 2018 and the Household Expenditure Survey[1]

- **This study examines the readiness of Israel's education system for the transition to remote learning, as it was possible to assess before the coronavirus crisis, and the differences in readiness between different population groups in Israeli society and in an international comparison.**
- **The analysis addresses two angles of the readiness for remote learning: students' access to infrastructures that enable effective remote learning (a quiet place for studying and a computer connected to the Internet), and the school's readiness to integrate digital tools into teaching (teachers' proficiency level and the extent of use of digital tools in routine teaching situations).**
- **An examination of the level of access to remote learning infrastructures, under the assumption of a demand for infrastructure by all students in the household, revealed that 60 percent of households in Israel have good access to remote learning: both a quiet place for studying and computer access; in approximately 20 percent of households, access to infrastructure that enables remote learning is very poor. A high proportion of students with a low level of accessibility belong to the ultra-Orthodox sector and to Arab society, two populations characterized by low income.**
- **Comparison of students' readiness level in normal times (with no competition for resources from other household members) on the basis of PISA data revealed that close to 80 percent of Israeli students have good access to remote learning infrastructure (a combination of access to a quiet place for studying and a computer connected to the Internet), a level slightly lower than the OECD average (81 percent).**
- **Only half of Israeli schools have teaching staff with technical and pedagogical skills for a transition to learning through digital tools, and with adequate support and technical assistance resources. This figure is significantly lower than the average of the OECD countries. Only one-third of Israeli schools had**

[1] Author - Sefi Bachar; Research Assistants - Uri Mishnayot and Yotam Nir.

programs for integrating digital tools in teaching in the precoronavirus period and the scale of digital infrastructure available in schools is significantly lower than that of the comparison countries.

- **If the system is required to return to remote learning ("a second wave"), it is advisable to reduce the number of hours that all students in the class are required to study simultaneously (synchronous hours) and to alternate the hours so that different grades study at different times. A combination of these moves is expected to reduce the pressure on the home infrastructure for remote learning. It is also important to quickly promote professional training of the teaching staff and upgrade the curricula in the digital environment.**

Background

The outbreak of the coronavirus pandemic and the social distancing that followed have led to most education systems in the world being required to change the nature of their activities and to transition quickly to a remote learning model.[2] This study examines the level of readiness of the Israeli education system prior to the crisis for the transition to remote learning, focusing on two key elements that may affect the success of remote learning: 1) **the level of students' access to infrastructure that allows effective remote learning—**access to a quiet place for studying and a computer connected to the Internet; 2) **the level of readiness of schools to provide remote services—**the level of proficiency of teachers and their support system, and the amount of use of digital tools in the precoronavirus period. The study is based on a number of major databases: the Central Bureau of Statistics Household Expenditure Survey for 2018, the PISA 2018 test data (student and school questionnaires) and the TALIS 2018 survey data conducted among teachers.

The motivation for conducting the survey is that in Israel, the transition to remote learning was accompanied by uncertainty about the level of readiness of the population for the change in the teaching method, which led, in the early stages, to the remote learning being defined as only voluntary, and to a possible adverse impact to the commitment of students and teachers to the new education method. In addition, given the understanding among education researchers that the rapid transition to remote learning may increase the achievement gap resulting from socioeconomic characteristics[3], mapping the extent of the population that does not have access to infrastructure at home that enables effective remote learning will help policymakers assess which students have been affected by the quick transition to remote learning and establish a more efficient policy in case it is again necessary to close schools in order to maintain social distancing.

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[2] According to UNESCO, approx. 1.2 billion students, representing approx. 72 percent of the world's students, have been affected by the pandemic. https://en.unesco.org/covid19/educationresponse

[3] OECD, 2020 A framework to guide an education response to the COVID-19 Pandemic of 2020

Student access to remote learning infrastructure—Israeli households and international comparison

Effective remote learning requires a combination of a basic home infrastructure: a quiet place to study, and a digital infrastructure that includes a computer that can be used for studying and is connected to the Internet. Through the Household Expenditure Survey 2018, we examined the proportion of households with children of education system age who have sufficient access to remote learning infrastructure, assuming that all household members are at home and competing for the resources. For example, all children of school age must use the digital infrastructure. For each of the indicators, we defined different levels of accessibility and examined the proportion of households that meet each of the following conditions:

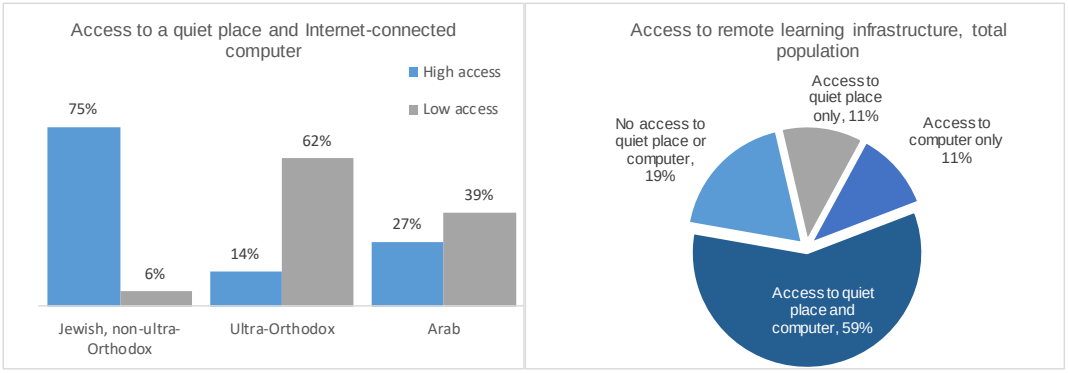
- **Access to a quiet place for studying—**calculated according to the ratio of the number of persons to the number of rooms in the household. Low accessibility was defined as a ratio of one and one third persons per room. For example, a family of 5 people in a 3-room apartment or a family of 6 people in a four-room apartment would be considered families living in high density.
- **Access to a computer connected to the Internet—**calculated by the number of children of education system age (5–17) relative to the number of computers connected to the Internet in the household—where a household is defined as having low accessibility if it has more than three children per computer.

The results of the exam showed that in Israel, approximately 60 percent of households with children of education system age have a high degree of access to an infrastructure that enables remote learning (less than 1.33 persons per room in the household, an Internet connection and less than three children of school age per household) (Figure 1). In 20 percent of households, accessibility to infrastructure that makes remote learning possible is very low. Examining the accessibility of different population groups[4] indicates that only approximately 15 percent of ultra-Orthodox households and approximately 30 percent of Arab households have high accessibility to the

[4] The groups are: non-ultra-Orthodox, ultra-Orthodox and Arab. The classification is based on respondent reports in Central Bureau of Statistics Household Expenditure Survey.

infrastructure enabling distance learning, compared to approximately 75 percent of non-ultra-Orthodox Jewish households.

Figure 1
Access to Remote Learning Infrastructure—A Quiet Place and an Internet-Connected Computer, 2018 Household Expenditure Survey



Accessibility to remote learning infrastructure – international comparison based on PISA 2018 Tests

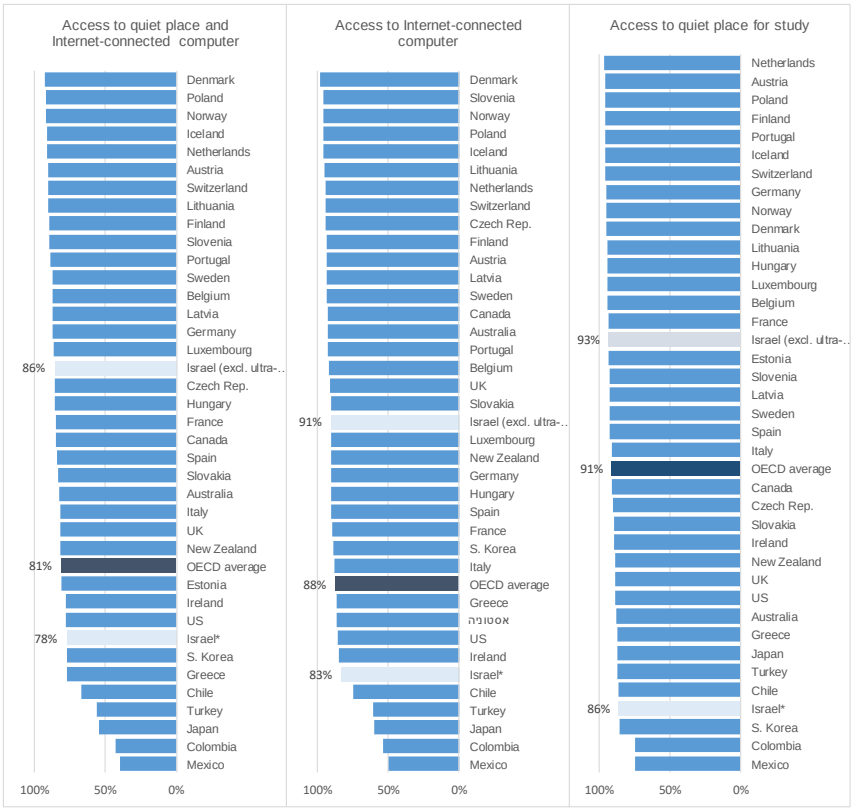
Another database that enables us to learn about students' access to remote learning infrastructure is the PISA test[5], which included several questions regarding the level of use of digital tools during normal times and without the assumption of simultaneous demand by all students in the household. The difference in the assumption regarding the demand from the rest of the household is expected to lead to the conclusions regarding the readiness of the population for remote learning in this section appearing to be better compared to the previous section. In addition, most of the ultra-Orthodox students do not take part in the PISA tests[6], so that Israel's data in an international comparison will represent an estimate based on the data from the Household

[5] The PISA test is an international test conducted among students aged 15 in 79 countries, including the 35 OECD member countries.
[6] The ultra-Orthodox supervision was omitted from the analysis because only students belonging to the Ministry of Education schools participate in the PISA tests and most of the ultra-Orthodox students are not included in this group. Therefore, an estimate was made of the level of use of the ultra-Orthodox students according to the Household Expenditure Survey. Without this estimate, Israel's data will be biased upwards, since they do not include a large proportion of the students belonging to the weak population in society, while in all other countries, all groups were included.

Expenditure Survey on the level of use of the ultra-Orthodox. At the same time, we also present Israel's data without the ultra-Orthodox calculated from PISA.[7]

In Israel, approximately 86 percent of students have access to a quiet place for studying, 83 percent have access to a computer connected to the Internet and approximately 78 percent have good access to remote learning infrastructure (Figure 2). Compared to the OECD countries, the level of accessibility in Israel is relatively low and in all parameters it is located in the bottom quarter. Without the ultra-Orthodox, Israel is at the center of the distribution, but this is of course compared to the general population of the other countries—including the weaker groups in those countries.

Figure 2
Access to Remote Learning Infrastructure—A Quiet Place and a Computer Connected to the Internet, 2018 PISA Data



* Data for Israel are the authors' processing and include an estimate of the level of accessibility of the ultra-Orthodox based on the Household Expenditure Survey and on the PISA data for Israel without the ultra-Orthodox.

[7] Alongside the study of this analysis, the National Authority for Measurement and Evaluation in Education (hereinafter: RAMA) has recently published an analysis that includes additional statements to those included in this analysis and related to online learning.

To summarize, the conclusions of this section indicate that in normal times, most students in Israel have high accessibility in their home to remote learning infrastructures, but this rate drops significantly in a situation of increased demand for the support infrastructures by other household members. This indicates that if the system will be required to switch to a remote learning mode ("a second wave"), a reduction of the synchronous learning hours[8] (the hours in which the student and the rest of the class work concurrently) by grade levels will enable a reduction of the "pressure" on the home infrastructure and increase the students' effective accessibility rate to the infrastructure enabling effective distance learning. In addition, the lack of access to remote learning infrastructures is particularly evident among the students in households belonging to the lower two deciles and especially among the students belonging to the ultra-Orthodox sector and the Arab society. This finding indicates that the transition to remote learning may increase the academic achievement gap between groups in Israel.

The level of readiness of schools to provide remote services

The expansion of remote learning in the Corona period has reinforced the understanding that effective remote learning cannot be conducted in the traditional learning format (frontal lecture of 45 minutes) with geographical distance between the teacher and the student, but that a change is required in how the material is taught and adapted to the new learning framework. In this section, we examine the level of readiness of the education system for the transition to remote learning based on the level of proficiency and adoption of digital tools in the pre-coronavirus period, based on responses from teachers and administrators in the international tests (PISA and TALIS).

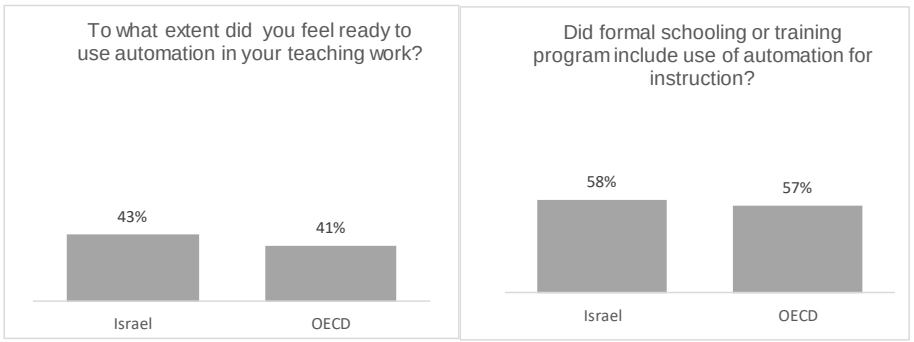
- **The level of proficiency of teachers and their support system**

The teachers' proficiency level combined with information and communication technology (ICT) for teaching was estimated according to the teachers' level of training based on the TALIS 2018 Survey, conducted among high school teachers (Figure 3).

[8] The Ministry of Education tends to divide the distance learning into synchronous learning hours (the student and the rest of the class work concurrently) and asynchronous hours (the students' independent studying). The assumption is that during synchronous hours the demand for distance learning infrastructure is rigid, while in the asynchronous hours, the student has more flexibility.

The analysis shows that approximately 60 percent of Israeli teachers have received training in the use of ICT for teaching purposes. Over 40 percent of Israeli teachers responded that they felt moderately or very prepared to use ICT in their teaching, a level that is similar to the average in OECD countries.

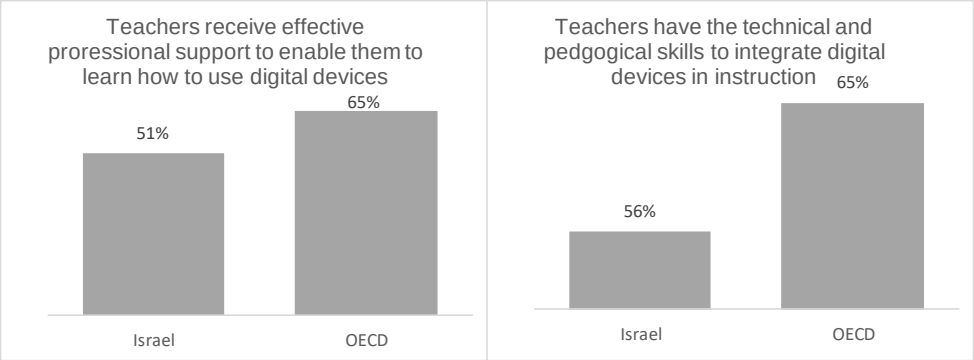
Figure 3
Teachers' skills level with ICT for teaching, by teachers' level of training—TALIS 2018 survey



Another way to test teachers' proficiency level is based on administrators' responses to school questions related to the proficiency level and support provided to teachers using digital tools (Figure 4). In Israel, only about half of the administrators responded positively (agree and strongly agree) to the question of whether the teachers have the technical and pedagogical skills needed to integrate digital tools into their teaching, which are necessary in order to adapt existing lesson plans to the various virtual space challenges.[9] A way to bridge the skill gaps for integrating digital tools in teaching is to provide support services and technical assistance to teaching staff, but here, too, only about half of the administrators agreed that the teachers receive professional and effective support for the use of digital tools. In both statements, the rate in Israel is significantly lower than the average in the OECD countries.

[9] Proficiency in the operation of digital tools (e.g., sharing presentations and problem-solving operations) and adapting lesson plans to the online environment.

Figure 4
Share of Administrators who Responded Positively to the Statements Regarding the Level of Skills and Support Provided to Teachers Integrating Digital Devices in Instruction, International Comparison, PISA 2018 Data

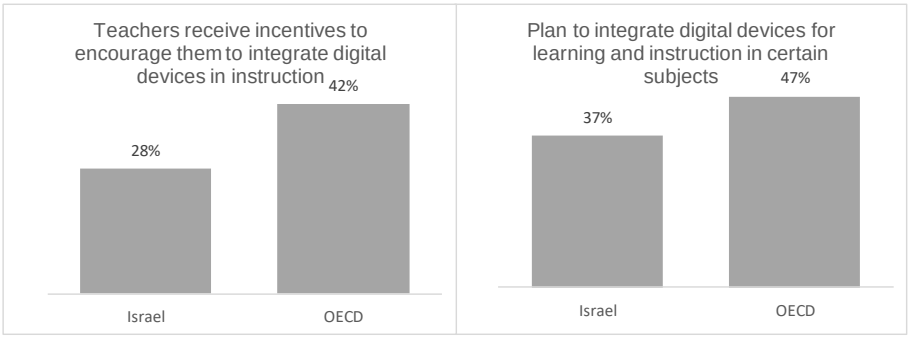


- **The extent of adoption of learning through digital tools in routine times**

The use of digital tools as a means of learning in rountine times (e.g., using presentations instead of the board) may make the transition to remote learning more effective, as teachers (and students) will be experienced in learning (and teaching) in an ICT environment, and also in building lesson plans and in other factors expected to influence learning effectiveness through digital tools.

In pre-coronavirus Israel, only a small percentage of schools (37 percent) incorporated digital tools into teaching, teachers were given incentives to integrate digital tools into their teaching at a low rate (28 percent). These rates are significantly lower than the average level of the OECD countries.

Figure 5
Share of Administrators who Responded Positively to the Statements Regarding the Adoption of Digital Devices in Instruction



- To summarize, an examination of the level of readiness of schools shows that only about half of Israeli schools were prepared before the crisis to make a transition to remote learning, a figure slightly lower than the corresponding figure in OECD countries. This is despite the fact that since 2015, Israel has been preparing for a scenario of transition to remote learning in an emergency. It is therefore important to quickly promote professional training of the teaching staff and upgrade the curricula in the digital environment.