

The Education System in Israel in the Time of the Coronavirus: Three Alternative Frameworks

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Following the end of the first wave of the coronavirus pandemic and a short respite, Israel entered a second wave involving a second lockdown and a gradual lifting of restrictions. In what follows, we will relate to three frameworks. The Ministry of Education's framework and the problems arising from it, and two alternatives: the first proposed by others and the second proposed by the author.¹ It is worth mentioning that the three alternatives relate to a situation in which there is only a partial lockdown, in which it is possible to operate the schools under conditions of social distancing. A full lockdown — like the ones between March and April and September and October — requires a different analysis and we will discuss that situation in brief at the end of this analysis.

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A number of months ago, the plan proposed here was presented to the media (Shtarkman & Detel, 2020) and in various government forums, and just recently, parts of it were adopted by the Ministry of Education and some local authorities.

This paper was written prior to the start of the 2020/2021 school year, and updated mid-December, 2020. Since the Ministry of Education frequently changes its guidelines for opening schools or returning to learning after a full or partial lockdown, and adds or removes restrictions that often contradict each other, some of the remarks and statements included in the paper may seem wrong or inaccurate — they were, however, right and accurate at the time of their writing.

1 Among those suggesting a second shift were Dr. Gideon Ben-Dror and Dr. Avraham Frank who presented their views on an internet forum that I manage.

Framework A: The Ministry of Education Framework

The Ministry of Education's framework, which relates to the opening of the school year on September 1st, 2020, included four main components:² strengthening the remote learning infrastructure (allocation of NIS 1.2 billion), the adoption of hybrid learning to varying degrees according to age group (NIS 2.6 billion), protection and hygiene (NIS 300 million), and solutions for special populations (NIS 200 million).

We will devote the analysis primarily to the hybrid learning component, since it has the greatest pedagogical and social impact. An official document published by the Ministry of Education (MOE) defined the learning configuration in the schools as follows:³

- Students in Grades 1–2 will learn in school in full classes for 5 days a week and for 5 lessons per day — for a total of at least 25 lessons per week (normally the standard is 29 lessons).⁴
- Students in Grades 3–4 will learn in school in groups of up to 20 students for 5 days a week (at least 25 lessons per week). One half of the lessons will be taught by untrained teachers (teaching assistants).⁵
- Students in Grades 5–6 will learn for 2 days a week (at least 9 lessons) in school in groups of up to 20 students. On the rest of the days, they will learn by remote teaching (the minimum standard during normal times was 32 lessons per week).

2 The framework set by the Ministry of Education was altered a number of times during the second wave of the pandemic.

3 See the Ministry of Education's Parent's Portal.

4 In the following discussion we will distinguish between "lessons" and "teaching hours." The term lesson refers to the time spent in class engaged in formal learning. The length of a lesson in Israel is usually 45–50 minutes. A teaching hour in the Ministry of Education terminology is usually a budgetary term that refers to the annual salary cost of 1 hour of the weekly workload of teachers in Israel. The workload of a teacher in elementary school is 36 teaching hours and in high school 40 teaching hours. Teaching hours are either frontal hours for the entire class, tutoring hours, or preparation hours. Upon the easing of restrictions following the second lockdown, these grades learned in "capsules." When Grades 5–6 returned to hybrid learning, capsules for Grades 1–2 were canceled to make space to open after school activities for the younger ages.

5 Without reducing the number of lessons per week, it will be necessary to double the number of teachers. The additional number of teachers will decline as the number of lessons per week and the allocation of teaching hours to other needs are decreased.

- Students in Grades 7–12 will learn for at least 2 days a week (at least 10 lessons) in groups of up to 20 students in school. On the rest of the days, they will learn by means of remote teaching (the minimum standard in middle schools during normal times is between 32 lessons per week per class of 20 students and 37 lessons per week per class of 40 students;⁶ in high schools, the number of lessons is not fixed and varies across individual students and study majors).

This framework raised a large number of questions at the time of its publication and questions continue to arise with its implementation at the end of the second lockdown. Many of these questions are unanswered:

- How many lessons will students learn? Students in Grades 1–4 will learn for 5 days a week, apparently for 25 lessons instead of between 29 and 32 lessons. Grades 5–12 will learn for 10 lessons a week in school and the rest — 20 lessons at least — by remote teaching. Even if the students will learn for the full number of lessons that they would have in normal times (a doubtful assumption), it is clear that for most of the students those hours will not be equivalent to frontal hours of instruction in the classroom. It is very important to stress that this calculation relates to the minimum required number of lessons as if they are the only teaching hours that the class receives. That is not a correct assumption, though. The fact that every class receives 60 teaching hours on average indicates that there is a significant number of allocated teaching hours that are not reflected in the standard minimum of lessons.⁷
- What will be taught in Grades 5–12 by means of frontal teaching and what by remote methods? According to one approach, while one-half of the class is learning in school the other half will be learning remotely, perhaps even taking an active part in the lesson by means of Zoom or some other application, and there will be no increase in the amount of homework

6 There is an implicit assumption in this directive of the Ministry of Education regarding the connection between class size and the required minimum number of lessons needed to achieve the goals set for the education system. It appears, on the face of it, that the Ministry assumes that an additional 5 lessons per week compensates, at least partially, for the addition of 20 more students per class.

7 A substantial share of these hours — like tutoring hours that are part of the teacher’s workload and that are particularly important due to large classes and a desire to close gaps — can be “saved” in the third framework presented here.

beyond what is currently assigned. According to this approach, the students learning at home will have the ability to pay full attention to the teacher and will gain the same benefit as the students learning in the classroom — which seems oddly presumptuous. According to a different approach, while the students learning in school are being taught, the students at home will be doing other tasks. According to this approach, the teachers will have to teach the same material twice (once with one group and then again with the other group), and, therefore, the material to be taught by the teacher will only be one-half of what it is in normal times.

- The rationale behind the division by age groups does not appear to be particularly sound. Is it clear that children in Grades 3–4 are in greater danger of being infected or of infecting others than children in preschool and Grades 1–2 and in less danger than children in Grades 5–12?⁸ Or perhaps the considerations are strictly financial and administrative, since it is not feasible to allocate additional budget and to hire more teachers in order to execute a plan that splits all classes?⁹
- How many primary school teachers will have to be hired and what will their skill level be? In the 2020/2021 school year, the primary education system will have about 6,000 classes per grade. Table 1 describes the additional classrooms, teachers, and salary expenditure on the assumption that Grades 1–2 will learn as normal, Grades 3–4 will learn in capsules of up to 20 students, and Grades 5–6 will learn for 4 days at home and 2 days in school.¹⁰ It is clear from the table that, under current conditions, an additional 10,848 to 13,829 teachers will be needed in primary education and the cost of their salaries will range from NIS 1.8 to 2.4 billion.¹¹

8 Contradictory data has recently been published on the infection of very young children. At least one study indicates that there is no difference in the ability to infect between children ages 0–6 and children ages 7–9. See Arutz 7, 2020.

9 A new explanation has recently been given for the cancellation of the learning capsules for Grades 1–2: the need to run after school programs based on students from the grade and not a single class. For this reason, the educational welfare and health of these children was compromised so that their parents could go back to work; it could have been done effectively and with low risk by a subsidy to the after school programs.

10 The Ministry of Education's framework does not include additional teachers for teaching in capsules in Grades 5–12; it is not clear how it will be possible to have remote teaching in these grades without additional teachers.

11 The Ministry of Education apparently took into consideration that Grades 3–4 will be learning fewer hours than the minimum standard and have announced that they will need an additional 13,000 teachers.

Table 1. Required number of additional classes and teachers for Grades 1–6 in capsules in the system and in the official school system

Grade	Total additional classes required	Total additional classes required in the official system	Total additional teachers required	Total additional teachers required in the official system	Total additional cost (NIS thousands)	Total additional cost in the official system (NIS thousands)
1–2	None	None	None	None	None	None
3–4	6,342	4,954	10,528	8,224	1,789,712	1,398,019
5–6	5,967	4,743	3,302	2,624	561,296	446,158
Total	12,309	9,697	13,829	10,848	2,351,008	1,844,177

Note: The calculation is based on 2018 data. This is for regular education in the official and recognized school systems. In Grades 3–6, all classes of over 20 students were split. Grades 1–2 do not require additional classes or teachers. For Grades 3–4, an additional 1.33 of a teaching position was added for each additional class. For Grades 5–6, an additional 0.33 teaching position was added because the capsules will meet only twice weekly. The additional cost per teacher is NIS 170,000 per year which is the average teacher salary.

Source: Nachum Blass, Taub Center | Data: Ministry of Education, The Wide Perspective website

- How many additional teachers will be needed to facilitate learning in Grades 7–12 on days when those students are in school and what will be the cost of their salaries?
- Where will the new teachers and teaching assistants come from? In an article in *The Marker* newspaper, it was stated that the teachers will be recruited from unemployed university graduates, freelancers, pensioners, students in teachers colleges, and teacher-soldiers (Detel, 2020). Ignoring the implicit lack of respect for the teaching profession, we can say that the chance of recruiting retired teachers is minimal since the vast majority of them are in high-risk groups with respect to infection (whether because of age or because they retired due to some health condition). Moreover, there is a reasonable concern that the teachers currently in the system will refuse to teach if they are in a risk group. A hint of this can be seen in the demand of the Israeli Teachers Union (a demand that has already been met by the government) to give teachers considered at high-risk the option of not working (Ilan, 2020). Furthermore, there is little chance of recruiting university graduates and freelancers for a full year since most of them will prefer to retain the option of returning to work in their occupation. This leaves only students in teachers colleges and teacher-soldiers. Do they constitute the professional manpower that will be responsible for the education of Israel's children for a full year?

- The framework proposed by the Ministry of Education also creates a shortage of classrooms, an inability among principals to control and supervise, and a major inconvenience among all those involved, namely parents, teachers, and students. When Grades 1–2 are learning normally and Grades 4–6 are split, very little room will remain in the school for the capsules of Grades 5–6.¹² Therefore, it will be necessary to identify and adapt rooms for use as classrooms, both inside and outside the school. As will be discussed, there are indeed various ways to deal with this problem, but this still remains a difficult task.

All of this ignores the problems that arise with remote teaching, with respect to the quality of learning relative to conventional in-school learning and the widening of academic and social gaps, on the one hand, and the significant risks implicit in students being outside the normal learning environment for an extended period of time, on the other hand (see Blass, 2020). Even if the problem of disparities in physical infrastructure is solved — an extremely optimistic assumption in view of the lessons learned from the “Computer for Every Child” project — the decision to employ remote teaching for all students implies a conscious admission that this will be a lost school year for most of the Bedouin and Haredi (ultra-Orthodox Jewish) populations and a significant percentage of students in other populations as well. It also shows that the decision makers in the Ministry of Education are prepared to accept this situation, which will undoubtedly widen gaps and will roll back gains in academic achievement.

In sum, the implication of the Ministry of Education’s framework is the complete loss of the school year for a significant share of students in Grades 5–12, the widening of academic and social gaps, and a huge financial expenditure.

12 This is because the split of Grades 3–4 will make it necessary to use classrooms that are normally used for Grades 5–6.

Framework B: A second shift¹³

The first of the two alternative frameworks involves the operation of the school system in two shifts, one in the morning and one in the afternoon. Theoretically, this implies that each capsule will learn according to the regular timetable, a situation that would require doubling the number of teachers. However, in view of the difficulty in adding a second shift during the afternoon hours, the advocates of this framework say that in most cases the first shift will be from 8:00 to 12:00 while the second will be from 12:30 to 16:30.¹⁴ Since this proposal is not feasible for Fridays, essentially the framework involves 20 lessons per week. Even if each shift is 5 lessons — i.e., until 13:00 and from 13:30 on — there will be no more than 25 lessons per week. There are, of course, various possible additions and modifications to this basic proposal, including longer lessons and less time for recesses, to allow more learning time in each shift.

Supporters of this framework mention the well-known fact that in the early years of the State, the education system was forced to operate in this format and that other countries suffering from a shortage of classrooms have also adopted this solution. The main advantage of the proposal is, of course, that it does not require any additional construction. Its basic disadvantage is the need to double the number of teachers in its unmodified version, that is, where students learn in two shifts with the full timetable of lessons as in normal times. If students learn fewer lessons, fewer additional teachers will be needed, and the framework will become increasingly similar to the third alternative framework. Another very important disadvantage of this framework is the almost inevitable decline in teacher quality as a result of the need to increase the number of teachers significantly at a time when the number of certified and qualified teachers available is limited. Furthermore, this framework is only a short-term solution and does not deal with the other problems of the education system.

13 The two alternative frameworks do not provide a solution for preschoolers and students in special education, and additional thought is required in order to find good solutions for these important groups. They are also relevant for the period after the lockdown with the end of the second wave of the pandemic.

14 This is essentially a compromise that, from the perspective of lessons, makes this framework similar to the third framework to be described.

Although this framework is preferable from a pedagogical perspective since all students continue to learn in school, it is problematic to implement due both to the large number of teachers required in order to implement it and the high cost involved.¹⁵

Framework C: Reducing maximum class size

The second alternative framework is based on reducing the maximum class size. The opposition to decreasing class size is based on two claims (Ayalon, Blass, Feniger & Shavit, 2020). The first is the need for a large number of additional teachers and the accompanying drop in teacher quality. The second is the need for a large number of additional classrooms. These two requirements both involve a major expense. The conclusion of the opponents to reducing class size has been that the expected academic benefit of such a move does not justify the cost. There are two assumptions buried deep within the traditional educational approach in Israel that constitute an obstacle to reducing class size: (1) that decreasing class size will not be accompanied by a change in the number of classroom hours per class; and (2) that the additional classrooms needed in order to reduce class size will be located in existing schools, and that they will be similar in physical area to existing classrooms.

However, the educational-socioeconomic reality created as a result of the coronavirus crisis nullifies these assumptions. First of all, according to the framework that the Ministry is already implementing, the vast majority of classes (of those who continue to learn in school) actually learn for fewer hours and some of them are doing so in much smaller spaces and outside the school. The question is, therefore, how to get the greatest benefit from the constraints that have been imposed by this reality and transform them into something positive. In other words, how can we ensure that the positive elements of these changes will not be temporary? The answer to this question is connected to the system's ability to reduce average class size at a reasonable cost and without harming academic outcomes.

In order to examine the problem of reducing class size in an in-depth manner, it is worthwhile to first present, in brief, four factors that to a large extent determine the education system's operating methods. These four factors,

15 More details on the drawbacks of this framework in the section that compares it to Framework C.

which determine the lion's share of expenditure on education and in practice also determine the system's academic achievements to a large extent, are: (1) class size; (2) number of lessons (in other words teaching time) per class; (3) teachers' salaries; and (4) teachers' total teaching hours and their division between actual hours of teaching in the classroom ("frontal hours") and hours devoted to preparing lessons or to individual tutoring. In Israel, classes are large, the number of teaching hours per class is high, teachers' salaries are low, and the number of frontal teaching hours is high. Other countries have chosen a different mix.

Up until now, there has been no practical option to carry out a major change in any of these components. The approach proposed here suggests that it is feasible and desirable within the existing budget framework to reduce class size and the number of lessons per student, without changing the teachers' total workload or their salaries.¹⁶ Although the outcome will be an increase in the number of classrooms and the accompanying budgetary expenditure, the cost can be minimized to a large degree by means of fine-tuning between the number of lessons and class size on the one hand and the use of learning spaces inside and outside the schools on the other hand (in the case of a larger reduction in hours per class, a larger cut in class size for a given budget can be achieved and vice versa). Is it possible to get "a square peg into a round hole" by reducing class size without significantly increasing the number of teachers and the costs of employing them and without building, at least in the short run, more classrooms? In our opinion, it is.

How can the need to increase the number of teachers be avoided despite the reduction in class size?

According to the figures of the Central Bureau of Statistics, the number of teaching hours per class in primary education is about 60 (1.66 full-time teacher positions) while in secondary education, it is more than 80 (a bit more than two full-time teacher positions).¹⁷ The number of students per full-time teacher is 15 in primary education and 11.4 in middle schools.¹⁸

16 Clearly this does not support any particular position on teachers' current salaries and workload. The point being made is that changes can be made within the existing budget framework.

17 See Appendix Table 1.

18 See Appendix Table 2.

These numbers indicate that the total teaching hours per class is greater than the lessons of frontal instruction that the class receives. Some of the additional hours are used for a variety of other needs, such as tutoring weaker students, splitting of classes into smaller groups, and grouping students according to ability in some subjects. This should not be interpreted as “wasted time” that necessarily indicates poor or wasteful management, but rather as an administrative and organizational approach that is predominant in Israeli education and that gives preference to large classes with a large number of teacher hours over small classes with fewer hours. As proof, the OECD *Education at a Glance 2020 (EAG)* figures show that the number of students per teacher in Israel is similar to the OECD average in primary education and less than the OECD average in the middle schools. In these countries, the classes are small and the average number of teaching hours are lower than the average in Israel.

Therefore, according to the standards of the Ministry of Education as they are currently implemented, in primary schools there are 16 full-time teacher positions in a school with 10 classes. In a secondary school with 10 classes, there are 20 teachers. Since most of the teachers work about a three-quarters position, an average primary school has 21 teachers while a middle school has 27 teachers.

In theory, and according to the data, it is possible to double the number of classrooms while keeping the same number of teachers by lowering the number of lessons to 20, at the very least. If the number of lessons per class is larger, there will need to be an increase the number of teachers; if class size is reduced, then the number of additional classrooms required will rise. The question of the effect of a reduction in teaching hours on academic achievement is an open question and calls for additional research. One study that touched on this question reached the conclusion that the ratio of teaching time to academic achievement is a complex one and is sometimes characterized by declining marginal returns; however, in that study, the number of lessons was not related to class size.¹⁹ A partial answer to this question

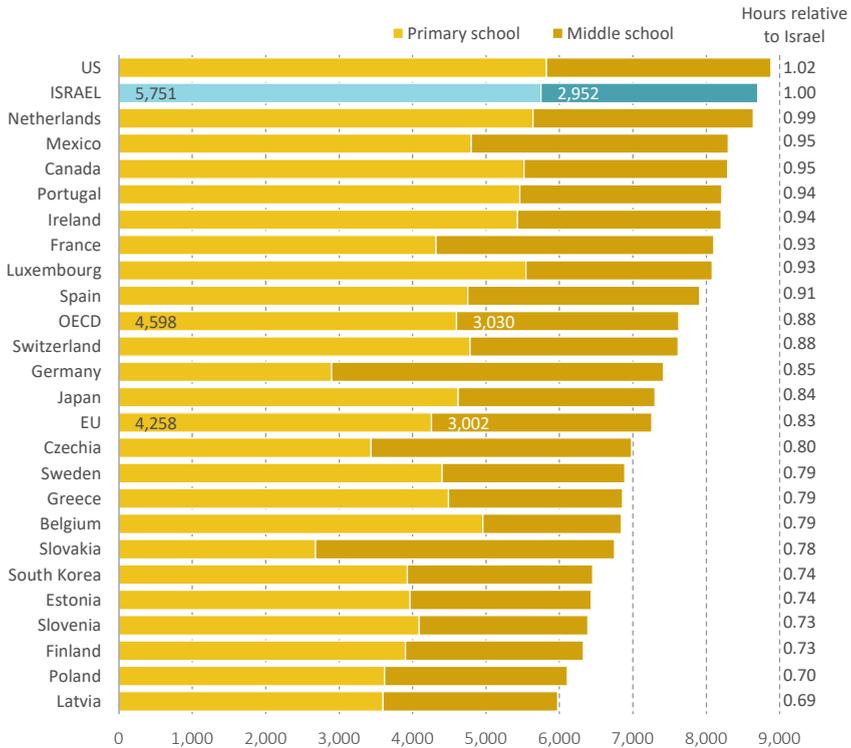
19 Innumerable studies have indicated that a reduction in class size will not bring about a large improvement in academic achievement. There are also any number of studies that point to the importance of the time devoted by a student to his studies. However, we are not aware of any research, and certainly not in Israel, that has looked at the effect of reducing the number of teaching hours on academic achievement as part of a move to reduce class size. An interesting study by the OECD relates to the issue of time devoted to studies (see Gromada & Shewbridge, 2016).

can be discerned from the data published by *EAG 2020*, according to which the number of compulsory hours in Israel in Grades 1–9 is higher than the OECD average by 12 percent and higher by 17 percent than the EU average. In primary education, the differences are 20 percent and 26 percent, respectively, while in the middle schools, the situation is reversed, although the gap is very small. Nonetheless, even though primary school students in Israel learn more hours than their counterparts in the OECD, their achievements are no higher. Overall, it is difficult to see any correlation between the minimum learning time (a concept used by the OECD in order to overcome differences between countries in the length of a lesson) and success on international tests, and many of the countries that are very successful on the PISA test are in fact located in the lower part of the table. Figure 1 presents the average number of compulsory hours that students in Israel learn relative to students in the OECD countries.²⁰

Overall, it can be concluded that as long as current organizational and administrative practices are maintained and the definitions and workload of a teaching position remain unchanged, a change in the school's organizational methods will make it possible to adopt a framework that is preferable to that of the Ministry of Education.

20 It is important to mention that the number of hours reported in the *EAG 2020* report is not consistent with the number of lessons that classes should receive according to the standard specified in the Director General Circular. The reason for this is that the *EAG 2020* report relates to an hour as 60 minutes while the Director General Circular relates to lessons as lasting 45–50 minutes.

Figure 1. Number of teaching hours in 9-year primary and middle schools (total) in OECD countries



Source: Nachum Blass, Taub Center | Data: EAG 2020, Table D1.1

Consider for example, a primary school with 10 classes, each of which has 30 students. According to the standards, each class is allocated 42 frontal teaching hours, 9 tutoring hours and 9 hours for teacher preparation. In practice, the minimum number of lessons in this school is about 30 and the rest of the hours are allocated to other educational and professional needs. According to the framework proposed here, each class would be split into two with each

receiving 21 lessons and 9 hours of tutoring and preparation hours,²¹ which would be accomplished without an increase in the number of teachers or an increase in the expenditure on salaries. This is also feasible, though to a lesser extent, in secondary education, based on a partial reliance on remote learning. At the end of the coronavirus crisis, it will be possible to return to larger classes and to begin an accelerated process of reducing maximum class size.

How can the need for additional classrooms as a result of the smaller class size be met?

Assuming that the problem of a shortage of teachers can be fully or partially solved (depending on the extent of the reduction in lessons per class) by reducing the number of lessons allocated per class, the remaining problem is the need to build new classrooms to accommodate the additional classes following the reduction. This problem is much more difficult to solve. In 2018, there were more than 61,000 classrooms. A maximum class size of not more than 20 would require an addition of about 36,000 classrooms.²² The addition would be about 20,000 classrooms for a maximum class size of 24, about 15,000 classrooms for a maximum class size of 26, and about 10,000 classrooms for a maximum class size of 28. (It is worth mentioning that the gradual process of reducing class size continued between 2018 and 2020, thus the data presented above regarding the need for additional classrooms is apparently biased somewhat upward.) Is this then a feasible project?

At first glance, it would appear to be an impossible task, particularly because when considering an addition to the number of classrooms it is generally assumed that the class size is in the vicinity of 30. However, when the class size is limited to 20 there will be a need to find solutions for classes whose average size is only about 16.6 in the immediate term (and if the maximum size will be 28 students per class, about 25 in the short and intermediate terms).

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- 21 The Ministry of Education's framework, according to which 13,000 teachers will be required in order to split Grades 3–4, assumes that every split class will continue to receive the same number of hours (although a certain reduction in hours is taken into account — otherwise 19,000 teachers would be needed).
 - 22 Not every split of a class that exceeds the maximum size requires a doubling of the number of classrooms. Thus, for example, two classes of 25 students will not be split into four classes of 12–13 each, but rather into only three classes of 16–17. Such a calculation, which takes into account the number of students in a grade and not necessarily in a single class, must be made for each scenario of a change in the maximum class size. See, for example, Appendix Table 3 for primary schools.

The size of such classrooms can be much smaller and therefore the problem is less difficult to solve. To illustrate, we will present a few possibilities for short-term and/or permanent solutions to the shortage in the number of classrooms.

Changes that do not require physical changes in the schools

- A. Using already existing space in the schools: According to the old Ministry of Education specifications, a primary school should have a classroom of 49 square meters for each homeroom class, an auxiliary classroom of 30 square meters for every 6 classes and a 10 square meter bomb shelter for every class (i.e., 60 square meters for every 6 classes, which is equivalent to two 30 meter rooms).²³ The new specifications are more generous and also include a science room and a library that can also serve as “safe” spaces, on the condition that there be a safe space of 15 square meters per class. This implies that for every 6 classes that need to be split, the school will have at least 1 classroom of 35 square meters that is used as an auxiliary classroom and another 30 square meters in the bomb shelter or 45 square meters of safe space. In the middle schools, there is additional space besides the homerooms. The task is not simple since they are probably used for other purposes, but it is possible.
- B. There are many schools that have shrunk in size over the years and in which there are unused classrooms. An investigation that we carried out revealed that in 2020, there were 519 schools, namely 10 percent of the total, in which the number of classes had fallen by at least three since 2010. It is likely that there are at least a similar number of schools in which the number of homeroom classes in 2020 is less than it was in 2010.
- C. Since 2010, 372 schools have been closed and those buildings are still standing today. Some of them have been converted to other uses while others are in locations that no longer have enough children. Some are in poor physical condition. To these should be added thousands of kindergartens in the same situation. In an emergency — like the current one — a significant number of these buildings can be put to use. This is worthwhile even if it necessitates the busing of children to the location.

23 These specifications, most which were drawn up decades ago, assumed — apparently on the basis of budget constraints and the educational reality at that time — that a class of up to 40 students can learn in a space of 49 square meters and a small class of up to 20 students can make do with 30 square meters. Currently, it is clear that these spaces do not support a reasonable quality of learning; nonetheless, this is the reality in most primary schools.

- D. A shift from a “homeroom classroom” to a “subject room” may also contribute to providing additional rooms for split classes (Blass, 1988).
- E. It is possible to organize secondary school such that each capsule of students will study six to seven lessons per day, three times a week in school; the remaining hours will be taught remotely.

Changes that require physical changes in the schools

- A. The closing-off of corridors and other spaces.
- B. The division of larger classrooms into smaller ones. If such a step is to be taken, then it is worthwhile thinking about smaller classes in order to prepare for a future reduction of classroom size.

Changes outside the schools that do not require changes in the nature of the schools’ activity

The working assumption here is that the inconvenience that results from learning outside the school — even if this involves busing — is far preferable to learning for only two to three days per week in school, some of which will be with uncertified teachers. In schools where students are in any case bused in (particularly in the regional authorities), it is possible to partially overcome the problem by staggering the start of the school day, such that the buses can do two rounds of pickups in the morning and also at the end of the school day.

The local authorities can distribute students between schools with large classes and schools with small classes, with the goal of reducing the number of classes that need to be split. For example, if in two schools combined there are 180 students in Grade 4, then if they are divided equally between the schools there will be a need for 10 classrooms. If one school has 95 students and the other 85, then 11 classrooms will be required: 6 in the first and 5 in the second. Thus, reallocation between schools by the local authority can save classrooms.

Changes outside the schools that require changes in the nature of the schools’ activity

- A. Although remote learning is not recommended, students in Grades 7–12 can learn for one day a week at home. In this case, their classrooms can be used by other students. Another option is that these grades will study for a few hours each day at school and complete the rest at home remotely (for example, a class of 20 students will learn for three hours in the morning in

school and another three hours in the afternoon at home, and the classes will switch with each other, as in Framework B above). In the middle and high schools, this solution is more feasible since the students are able to learn for more days and/or hours at home.²⁴

- B. A more radical solution, though, with a great deal of pedagogical potential, is that each class will learn for three weeks in school, and one week outside the school. The fourth week can be devoted to activities beyond the conventional school-based ones, such as learning in a museum for science and art, a tour of various national institutions, field trips in the immediate area, or more traditional learning. To this end, every school, in coordination with the local authority education departments, can make arrangements with public and private institutions in its vicinity. This change requires that the Ministry of Education and the local authorities create frameworks to formalize their responsibility for the security and safety of the students. Principals and teachers must feel confident that should something happen to a student, insurance coverage by the Ministry will be in place.
- C. A change in the structure of the school year with schools operating all year long. For example, the school year will be divided into four quarters and at every point in time 75 percent of the students will be learning in the school.

The proposals presented so far provide a solution for the school's regular hours of activity. Each of them involves some inconvenience and sometimes a drop in the level of service in the school, but in my opinion these are small relative to the benefit provided by this framework, namely the possibility of continuing operation of the entire educational system inside the schools with certified teachers during the entire week.

There will be a reduction in the number of lessons that students, especially the youngest ones, spend in school, so it is important to supplement these recommended steps with several additional measures to extend the school day and provide a solution for the hours following the end of formal learning. To this end, there are several possible frameworks, which can, of course, be implemented simultaneously.

24 Remote teaching as part of the teaching process also requires that the role of remote teaching within the structure of the teacher's workload be considered. It is suggested that a rule be adopted whereby an hour of remote teaching will be equivalent to an hour of frontal teaching. The division of a teacher's hours will be determined through agreement between the school's principal and the teacher, in accordance with the directives of the Ministry of Education.

Extracurricular activities are one of the main components of after-school activities. Teachers whose teaching hours have been reduced following the reduction in class size or who for various reasons have been forced to work part-time in “conventional” teaching in the school and wish to supplement their teaching hours) can be used for this as well as instructors in sports and art, youth movement counselors, volunteers, and older students. This part of the school day will not be compulsory, but will provide a solution for families that have young children and for parents who work full-time.²⁵ The expansion of extracurricular activity in the school for higher grades will compensate to a large degree for the lack of interpersonal contact in the event that the system is forced in the future to use remote instruction to a greater extent for one reason or another.

It is also possible to reconsider the possibility of a transition to a five-day school week, which will facilitate an addition of one lesson per day. Most of the economy already works a five-day work week (Committee to Examine the Structure of the Work Week, 2013). The shift to a five-day school week will not be immediate and it must be based either on a decision by the local authority or alternatively a survey among the parents. For those who are interested in having their children attend school on Fridays, a solution can be provided that is similar to the existing after-school frameworks.

Finally, it is also possible to imagine an interim solution that is a hybrid between the second-shift solution (Framework B) and the reduction-in-class-size solution (Framework C), such as a framework in which primary schools will operate during a “first shift” from 8:00 to 12:00 while secondary schools will operate from 14:00 to 18:00. The former will use the secondary school facilities in the morning while the latter will use the primary school facilities in the afternoon. This will provide a solution to the shortage of classrooms. Moreover, while the students in the lower grades are in school those in the higher grades can learn with greater efficiency at home, without their younger siblings distracting them.

25 The hours of extracurricular activity will be provided free of charge or with a large subsidy to be financed by the budget saved through the drastic reduction in the hiring of new teachers.

As can be seen, there are a variety of solutions to an acute shortage of buildings. These solutions are not always optimal and each of them entails organizational and pedagogical problems. At the end of the day, though, each student will have a place in a permanent or temporary classroom. The Ministry of Education's high level of flexibility in adapting to a shortage of buildings was impressively demonstrated during the large wave of immigration from Russia the late 1980s and early 1990s.

It is clear that such a major change is a transformative process and involves numerous obstacles. Some of these are objective, such as the shortage of buildings and teachers, while others are connected to the work habits that have become so deeply rooted over the centuries. Still others are genuine pedagogical and organizational problems. However, the chance of changing the reality of the school is so great that it is worth overcoming these obstacles.

The basic difference between operating a second shift (Framework B) and reducing the maximum class size (Framework C)

What is the difference?

On the simplest level, the difference between the two proposals can be characterized as follows: Framework B does not require additional classrooms. Framework C, in its perfect configuration, does not require additional teachers.

What are the advantages of the proposal to reduce class size over the second-shift solution?

The main advantage of the proposal to reduce class size is that it avoids the need for massive hiring of new teachers. The transition to two shifts in the entire education system in the "pure" configuration requires that the number of teachers be doubled. There is no practical way to fulfill that condition. The possibility of fulfilling even a less extreme condition with an addition of 50 percent to the teaching staff is also not realistic. It should also be kept in mind in the case of a long-term crisis, that some of the existing teaching staff are members of high-risk groups by virtue of their age or other health factors and others may be forced to spend time in quarantine after exposure to a confirmed patient or even stop teaching temporarily or permanently.

In view of all this, it is clear that the proposal to switch to two shifts is almost certainly untenable. Moreover, hiring teachers who do not have appropriate training or have not been teaching for a long time can lead to a major drop in the quality of teaching. In contrast to the proposal to operate a second shift, the proposal to reduce class size does not require any addition of teachers and, if an addition of teachers is nevertheless needed, it will involve only a small number of hires. It is clear that under the second-shift proposal, the greater the tendency to compromise on the number of learning hours and to change the employment conditions of the teachers, the closer the proposal will come to the principles of the third framework.

The second advantage is the required budget. According to Ministry of Education data, the cost of operating a class in a primary school is between NIS 400,000 and NIS 450,000 per year and the cost of building a classroom of 50 square meters is about NIS 250,000.²⁶ Even a cursory glance makes it clear that, at least from a budgetary perspective, it is preferable to split classes than to have a second shift, since the cost of splitting is much lower. This result becomes even more impressive if one notices that, in the case of multi-year changes, the cost of construction is only a one-time expenditure while the expenditure on the salaries of teachers and other workers on a second shift recurs every year. Moreover, there is the additional and significant cost of training new teachers in addition to the cost of salaries and the growth in the number of retirees that have to be replaced (retirees are in general a fixed share of the total number of teachers).

In addition to the pedagogical and budgetary advantages of the third framework, it is worth considering a number of additional problems with the framework that promotes learning in shifts, some of which are organizational while others are pedagogical, and which are avoided in the framework that centers on decreasing the number of students per class.

26 This is the net cost for a classroom of about 50 square meters. The cost of building a square meter in 2020 was NIS 5,000, according to the Building and Development Authority website. The cost is higher, of course, considering the accompanying gross meterage. In the case of building a new school, including all of the spaces it includes (administrative, public areas, corridors, and the like), the cost is much higher. However, we are dealing with an addition to an existing building in our context, rather than building new schools. See the website of the [Development Authority](#), Ministry of Education.

- The operation of the schools during the coronavirus crisis requires a significant increase in the school's maintenance staff, due to the need to disinfect and clean the washrooms and the common areas several times over the course of the school day. The introduction of a second shift requires a doubling of the number of cleaners in the schools.
- The operation of a school in two shifts also requires an increase in the number of managerial and administrative staff. It is not reasonable to assume that school principals will remain in the school for a second shift or that there will be two principals in the same school. Furthermore, if the function is assigned to the vice-principal, then it may be claimed that there is no need for that position in normal times.
- In places where the students are bused to school, there will be a need for two rounds of busing. In many locations, the buses have a long journey, sometimes almost an hour. Therefore, a long recess between shifts will be needed or alternatively a doubling of the number of buses will be necessary. This is a particularly large investment that is liable to become redundant with the return to routine.
- The need to allocate teachers and students between shifts will create organizational and professional problems. Which rules will be used to determine who will teach in the first shift and who in the second? How will the rules be determined for dividing the students between the shifts and how will the needs of the teachers be taken into account?
- Currently, classes in the various grades finish their school day at different times, with higher grades learning more hours. There is no possibility of a reasonable second shift (a first shift until 12:00 and a second shift that starts at 12:30) without cutting the number of learning hours by 20 percent in Grades 1–3, by 25 percent in Grades 4–6, and by 50 percent in Grades 7–12. Although this can free up teaching staff, the reductions are temporary and therefore will generate many professional problems. Which teachers will have their teaching hours cut? Which teachers will return more quickly to teaching full-time? And so on.
- If the school operates in two shifts, it will be impossible to have after-school frameworks or any other informal activity. This eliminates the possibility of providing solutions to keep children busy and in school in the afternoon hours. The operation of two shifts (particularly in primary education) does not provide a practical solution for parents who need to work, especially in the case of families in which both parents work.

What needs to be done when a full lockdown is imposed on the entire country or in certain cities?

Obviously, none of the solutions presented above are relevant in the case of a full lockdown, in which children do not have the option of attending school and most parents are forced to stay at home. Such a reality requires other solutions that can deal with both the educational and social loss. Weaker populations are especially vulnerable in this situation, as are students in Grades 11 and 12, as long as there is no dramatic change in the bagrut exams. The following are some measures that should be considered now:

- A. Reinforcement of the network of truant officers, guidance counselors, social workers, and public health nurses who can monitor the most vulnerable populations and stay in continual contact with them.
- B. Creation of a network of volunteers from among educators, both past and present, who will serve as mentors for students and will ensure that suitable solutions are provided to the problems they encounter as a result of their extended confinement at home.
- C. Recruitment of students in the higher grades as mentors of students in the lower grades.
- D. Generous funding of remote informal educational activities, such as art groups and even physical education, and the coverage of the salaries by the Ministry of Education.

SPOTLIGHT

A note on the interchangeability of class size and the number of teaching hours

The aim of education is first and foremost the nurturing of values and knowledge. For the most part, education relies on the economic infrastructure that society is willing to allocate to it. As in any other area, those who stand at the head of the education system are required to prove that the resources that are allocated are used in the most effective manner. The scope of those resources is determined by a number of variables, some of which are rigid and hard to change in the immediate or short term (the size of the student population, its geographic dispersion, the political-social circumstances and its implications), and some “policy variables,” which are relatively easier to manipulate (upper and lower limits for the number of students in a class, the minimum number of teacher hours per student, the size of a teacher’s teaching load and its composition, as well as teacher salaries). The mix of decisions on all of these variables — in economic terms, the production function of education — is particular to each country and its society. It is influenced as well by overall expenditure, and the style and character of the education system and its operation, and it affects, to a great extent, its results.

The coronavirus pandemic that is currently raging worldwide has an unprecedented impact on at least two of the variables mentioned above: the number of students per class and the number of learning hours. The number of students has dropped,

at times even drastically, due to the need to allow greater physical space and social distancing between students. The decrease in the number of students per class has meant that the number of classes has increased, and has also meant — other things unchanged — that the number of teachers has had to increase. All this at a time when the system was already suffering from a shortage of teachers in certain geographic areas and for certain subject areas. One way of surmounting the need for more teachers has been to reduce the number of teaching hours per class without reducing the workload per teacher.

How have these changes affected the education system? While recognizing that the education system has several very important functions other than that of imparting knowledge in terms of academic achievements, there are two possible and conflicting outcomes.

Decreasing the number of students per class: From the professional literature and accumulated educational experience it seems that there is a limited, positive impact to this, and there are apparently other good and less expensive ways to improve academic achievements. Thus, in strictly economic terms, the high price in reducing the minimum standard number of students per class is most probably not justified. It should be emphasized, though, that the majority of studies on this subject dealt with a reality that is not relevant to Israel where the upper limit of the number of students per class stands at 34 to 40 (depending on the age and socioeconomic characteristics of the class and school).²⁷ The work by Glass and Smith (Glass & Smith, 1979 p. 12) shows this clearly. In terms of Israel, the finding that there is little difference in achievements between classes of 40 students and those of 20 students turns every effort to reduce class size in

27 Despite the time that has elapsed since these studies, and the hundreds if not thousands of papers on the subject, it doesn't seem that the findings and conclusions drawn by the researchers differ greatly today.

order to improve academic achievements to unproductive — at least under the conditions that prevailed prior to the outbreak of the coronavirus.

Time allocated to teaching: The discussion on the relationship between time spent actively on learning (teaching hours) and achievement has been widely studied. One dominant study in the field, conducted many years ago, is that of Henry Levin (Levin, 1986). He compared several methods that are meant to improve academic achievements — additional teaching hours, reducing the number of students per class, personal tutoring by peers or adults, and learning by computer. He found that when the goal is improving achievement in mathematics, the least effective method is additional teaching hours, and when the improvement required is in reading comprehension, the least effective method is reducing the number of students per class.²⁸

Another study recently conducted by Victor Lavy finds that increasing the amount of time in class improves achievements, although the study measured the addition of relatively few hours (Lavy, 2020). An earlier study (Lavy, 1999) concluded that reducing the number of students by about 20 percent, from 30 to 25 students, brings about an improvement in achievements equivalent to an addition of 4.2 learning hours. In financial terms, reducing class size is more expensive than adding teaching hours, so the second option is preferable (Lavy, 1999, pp. 25–26). With a simple yet extreme assumption that Lavy's calculations were correct and hold today, then the damage to academic achievement caused by reducing class hours necessitated by the corona crisis will be overcome, or at least minimized, by the reduction in the number of students per class. Any change must be accompanied by changes in teaching methods to bring about an improvement in achievements.

28 Nevertheless, teaching by older students is a more effective method than either reducing the number of students or adding class hours.

Conclusion

We have outlined three alternatives to dealing with the coronavirus crisis. It is likely that there are others. Since they involve different approaches to dealing with the coronavirus reality that was forced onto the education system, it is proposed that the Ministry of Education present the various options to the local authorities and that each of them (and perhaps even each school) choose what they consider the most desirable alternative, in consultation with the teachers unions and the local parents. The following principles should be emphasized:

- A. Preference for learning in schools over remote teaching.²⁹
- B. Minimum hiring of additional teachers and avoidance of hiring individuals without classroom training (they can be hired for other roles).

We already know of more than a few local authorities that have deviated from the Ministry of Education framework and have increased the number of days of in-school learning. To this end, they have adopted many of the solutions presented in this document. For example, we know of one large local authority in which all of the primary schools began learning five days a week. In other locations, individual schools also found solutions that were suited to their specific reality. This situation constitutes proof that if the conditions are thoroughly evaluated, it is possible — even within the constraints imposed by the Ministry of Education and the Ministry of Health — to find solutions that enable students to study for additional days in school. Our recommendation to continue to use this unique opportunity to dramatically reduce the number of students per class, while intelligently and creatively combining studies in classrooms with remote learning cannot be overstated.

Finally, a warning: the solution of reducing class hours as a way of reducing class size might charm those wishing to cut the education budget. Certainly there are those who believe that class hours can be cut even without reducing class size and thus billions can be saved. In order to ensure that cuts in class hours will not harm educational and academic achievements, though, they must be accompanied by reductions in class size and additional steps like changes in pedagogical methods and frameworks for extracurricular activities.

29 We are not opposed to remote teaching in principle and we are not ignoring its many advantages. However, in our opinion, it should serve as a supplement to teaching in schools rather than a substitute. It is essential that caution be used in the use of remote teaching in view of the risks of the widening of academic and social disparities.

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Appendix

Appendix Table 1. Average number of weekly work hours per class by education sector

	1995/1996	2000/2001	2005/2006	2010/2011	2015/2016	2018/2019
Total	50.9	52.1	52.5	56.3	65.8	69.6
State	53.5	56.1	55.8	60.4	73.4	75.6
State-religious	54.0	55.3	56.9	61.0	71.9	76.1
Haredi	37.8	36.4	39.0	38.1	38.8	46.6
Arab	45.0	49.0	50.7	57.7	66.3	70.8
Primary school						
Total	45.3	44.4	45.6	54.6	57.9	56.6
State	47.8	47.6	47.6	59.7	63.6	60.7
State-religious	48.7	47.5	46.0	56.6	61.2	59.8
Haredi	32.6	31.2	35.6	38.4	40.3	41.0
Arab	41.5	44.6	48.7	58.0	60.6	60.9
Middle school						
Total	50.6	59.8	60.7	58.6	80.1	84.9
State	50.3	61.5	62.8	58.3	81.4	85.4
State-religious	51.1	60.6	67.7	60.0	82.9	84.3
Arab	50.8	52.9	50.6	58.3	76.2	84.3
High school						
Total	55.0	53.9	53.4	49.5	66.8	78.2
State	58.8	56.7	55.8	54.0	77.4	89.2
State-religious	56.2	54.0	60.2	59.6	78.0	97.6
Haredi	45.3	45.8	44.3	29.9	31.0	38.1
Arab	44.8	51.1	48.6	49.0	67.0	78.6

Source: Nachum Blass, Taub Center | Data: CBS, 2019

Appendix Table 2. Average number of students per full-time teacher (FTE)

Education level	Average number of students per teacher		Average number of students per FTE teacher	
	1999/2000	2019/2020	1999/2000	2019/2020
Total				
Primary school	13.0	11.8	17.1	15.0
Middle school	11.5	7.7	14.1	11.4
High school	9.1	8.4	11.7	11.4

Source: Nachum Blass, Taub Center | Data: CBS, 2020

Appendix Table 3. Additional classrooms needed for the alternatives proposed for the various reductions in student per class numbers in primary school

Grade	Existing classrooms	Addition needed to reduce to 24 students per class	Addition needed to reduce to 26 students per class	Addition needed to reduce to 28 students per class
1–3 Official ed	13,178	4,320	3,121	2,087
1–3 All	17,238	5,959	4,403	3,013
4–6 Official ed	11,805	4,456	3,381	2,413
4–6 All	15,400	5,963	4,566	3,296
Additional classrooms needed in percent relative to existing number				
1–3 Official ed		33%	24%	16%
1–3 All		35%	26%	17%
4–6 Official ed		38%	29%	20%
4–6 All		39%	39%	21%

Source: Nachum Blass, Taub Center | Data: Ministry of Education, A Wide Perspective