Achievement Gaps between Hebrew-Speaking and Arabic-Speaking Students[1]

- **Comparison of achievements between schools in a similar socioeconomic cross-section indicates that the achievements of Arabic-speaking schools are greater than the achievements of Hebrew-speaking schools in a similar socioeconomic cross-section. These findings support the hypothesis that the achievement gaps between the Hebrew-speaking education system and the Arabic-speaking system are mainly due to the difference in the socioeconomic composition between the two groups.**
- **The results of the study show that the claim of inefficiency in the Arabic-speaking education system in relation to the Hebrew-speaking system is not supported by the data when the comparison is focused on schools in a similar socioeconomic cross-section.**

This box deals with the achievement gaps between students in the State-Arab education system and students in the Hebrew speaking education systems.[2] The achievement gaps exist from primary education (according to the Meitzav exams) and widen throughout the advancing stages of education. In high school, the achievements of Arabic-speaking students are lower than those of their Hebrew-speaking counterparts, which is reflected in higher dropout rates and in a lower proportion of those eligible for a matriculation certificate (Figures 1-A and 1-B). The scores in the PISA 2018 tests showed that the achievement gap between the groups in the various disciplines has widened in recent years, mainly as a result of the weakening of the Arabic-speaking students' achievements (Figures 1-C and 1-D).[3] In contrast, Blass (2020)[4] found that although the achievement gaps are considerable, in recent years they have actually narrowed (as seen in Meitzav exams, completion of studies, matriculation eligibility, and the commencement of studies at an institution of higher education), in particular when

[1] Author - Sefi Bahar; Research Assistant - Uri Mishnayot.
[2] The education system in Israel is divided into four main systems (State-Hebrew, State-Arab, State-Religious and Ultra-Orthodox), serving population groups that differ from each other in their language of study, religious level and curriculum.
[3] National Authority for Measurement and Evaluation (RAMA) (2019). Pisa 2018: Literacy among 15-year-old Students in Ramat Gan: National Authority for Measurement and Evaluation in Education.
[4] N. Blass (2020). Achievements and gaps in the Israeli education system: A Snapshot. Taub Center.

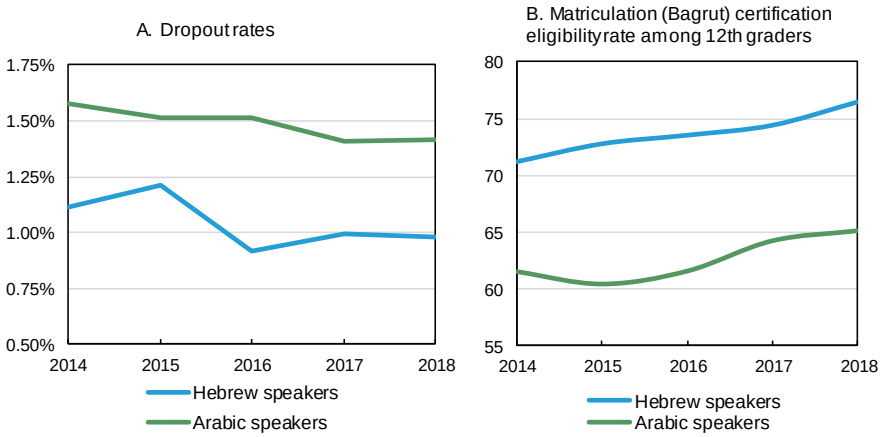
comparing individuals whose parents' education is the same. Researchers from the National Authority for Measurement and Evaluation (RAMA, 2017) found a large achievement gap in mathematics in favor of Hebrew speakers, but this is greatly diminished when considering the socioeconomic background of the individuals. They note that the reason for the widened gap in the PISA tests is that the tests examine math literacy and not necessarily knowledge of the specific material studied.

One of the hypotheses about the source of the sectoral achievement gaps is that they stem from the inefficiency of the Arabic-speaking education system (in adapting the curriculum and allocating resources).[5] This approach questions the benefit of increasing the investment in Arab state education, arguing that increasing resources to date has not led to a narrowing of the gaps. However, this argument ignores the differences between the socioeconomic groups, a background characteristic that has been found in many studies to be correlated with low educational achievement.[6]

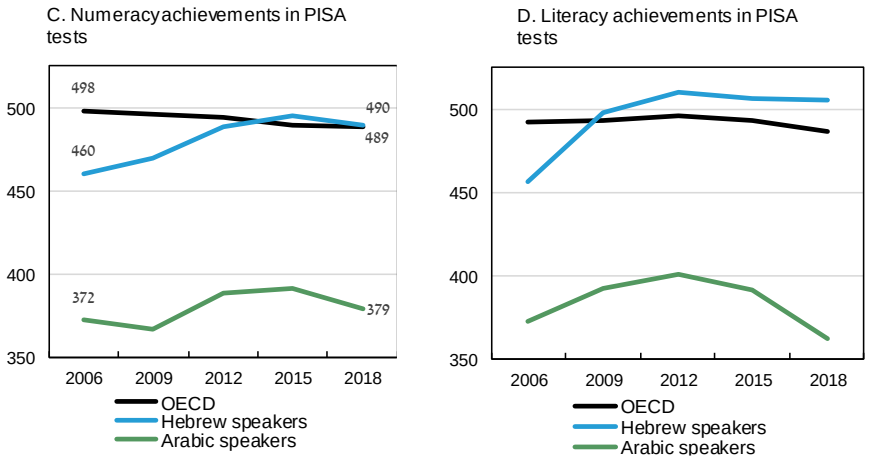
A further examination of the sectoral gaps, conducted by the Chief Economist at the Ministry of Finance[7], showed that the probability of success of Arabic-speaking boys was lower than that of their Hebrew-speaking counterparts in all the variables examined (admittance to matriculation exams, eligibility for matriculation certificate, matriculation certificate that includes 5 points (the highest level) in mathematics and in English), even after considering the eighth grade achievements and the different background characteristics of the students. Among girls, the findings were mixed. According to the study's authors, "barriers and failures in high school" have a major impact on the gaps between the groups.

[5] These issues were mentioned in the remarks of the Minister of Education and the Director General of the Ministry regarding the establishment of a special examination team following the widening of the gaps in the PISA 2018 exams.
[6] OECD (2018), *Equity in Education: Breaking Down Barriers to Social Mobility*, PISA, OECD Publishing, Paris - A literature review on the effects of background characteristics on student success is presented.
[7] Chief Economist Division, 2019, Weekly Economic Review - "On the Gaps between Arab and Jewish Students in Matriculation Achievements" April 29, 2019.

Figure 1
Achievement Gaps between Hebrew and Arabic Speaking Stuedents in PISA and Various Upper School Indices



SOURCE: Based on Ministry of Education, the Educational picture: Upper secondary school.



SOURCE: Based on RAMA 2019.

The unique contribution of this box to the discussion of the sectoral achievement gap in Israel is in the comparison of this gap—for the first time—among schools where the concentrations of socioeconomically disadvantaged students are similar. According to research evidence, the school environment has a strong impact on the student's achievement[8], and this is in addition to the influence of his or her personal characteristics (peer effect). Because most Arab students belong to a low socioeconomic level, their very concentration in schools with a high rate of students with low socioeconomic characteristics may explain a large part of the sectoral gaps in achievement. Comparing the (measurable) achievements of schools with the same nurture indices (see below) may therefore contribute to understanding whether the

[8] OECD (2018). *Equity in Education: Breaking Down Barriers to Social Mobility*, PISA, OECD Publishing, Paris, https://doi.org/10.1787/9789264073234-en.

sectoral achievement gaps reflect the ineffectiveness of the Arabic-speaking education system compared to its Hebrew-speaking counterpart or, in particular, the socioeconomic level of the students.

The comparison will be made using the data of the Ministry of Education's School Nurture Index. The nurture index measures "educational deprivation" and is calculated for each student based on the following components[9]:

- Education of the higher educated parent (40 percent)
- Family per capita income (20 percent)
- School peripherality (20 percent)
- Combination of immigration and distressed country (20 percent)

The index score is divided into deciles. Decile 10 contains the students who need the highest level of nurture (i.e., those whose background characteristics are the lowest) and Decile 1 contains the students who do not need additional nurturing (i.e., those with the strongest background characteristics). This box has used the highest level of detail published by the Ministry of Education—the nurture decile at the school level. In early education (elementary and middle school) the nurture index is an operational tool for differential resource allocation ("nurture basket").[10] The differential resource allocation is mainly expressed in the number of hours, negligible in relation to the number of students in the class and not present in the teachers' wages.

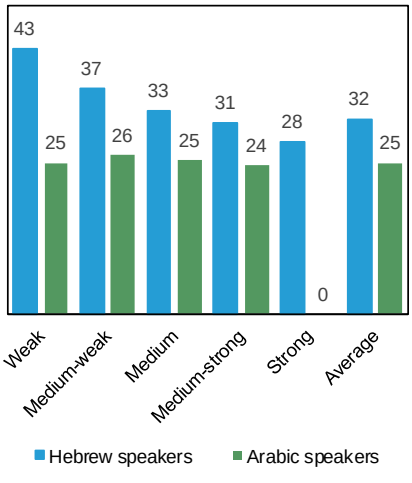
In Israel, most students in the high deciles of the nurture index are Arabic-speaking students. These students receive a significantly lower allocation of resources compared to Jewish students who are in a similar nurture decile, and the resource allocation gaps continue throughout the educational stages. The largest budgeting gaps are in the high schools[11]. Figure 2-A presents the distribution of students in high schools by sector and quintiles, and shows that the quintile containing the strongest students (Deciles 1 and 2) does not have Arabic-speaking students. Most of the Arabic-speaking students (63 percent) are concentrated in Deciles 9 and 10, which have almost no Hebrew-speaking students (6 percent). Figure 2-B shows the budgeting for a student in high school, according to the grouping of the nurture index quintiles.[12] Although there is no formal

[9] Ministry of Education website - https://edu.gov.il/sites/Shaar/Pages/madad_tipuach.aspx
[10] In high schools, there is no differential budgeting.
[11] Ministry of Education (2019), Key Findings of the Education Budget Transparency System – 2019.
[12] The group ranges from Deciles 9-10, "weak" to Deciles 1-2, "strong".

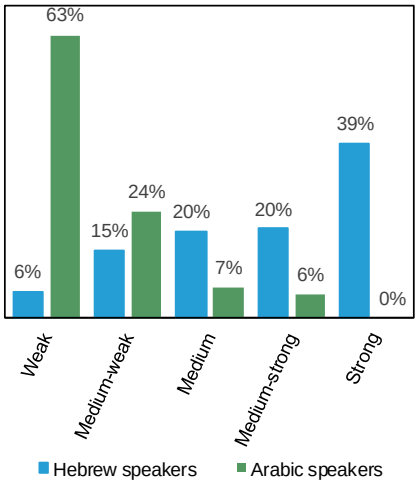
differential allocation of resources according to this component in high schools, there is a positive correlation between the nurture decile and the expenditure per student with regard to Hebrew speakers (0.412), but not regarding Arabic speakers.

Figure 2

B. Average Cost per Secondary School Student, by Sector and Nurture Quintile, NIS thousands



A. Distribution of Secondary School



SOURCE: Transparency in Education findings.

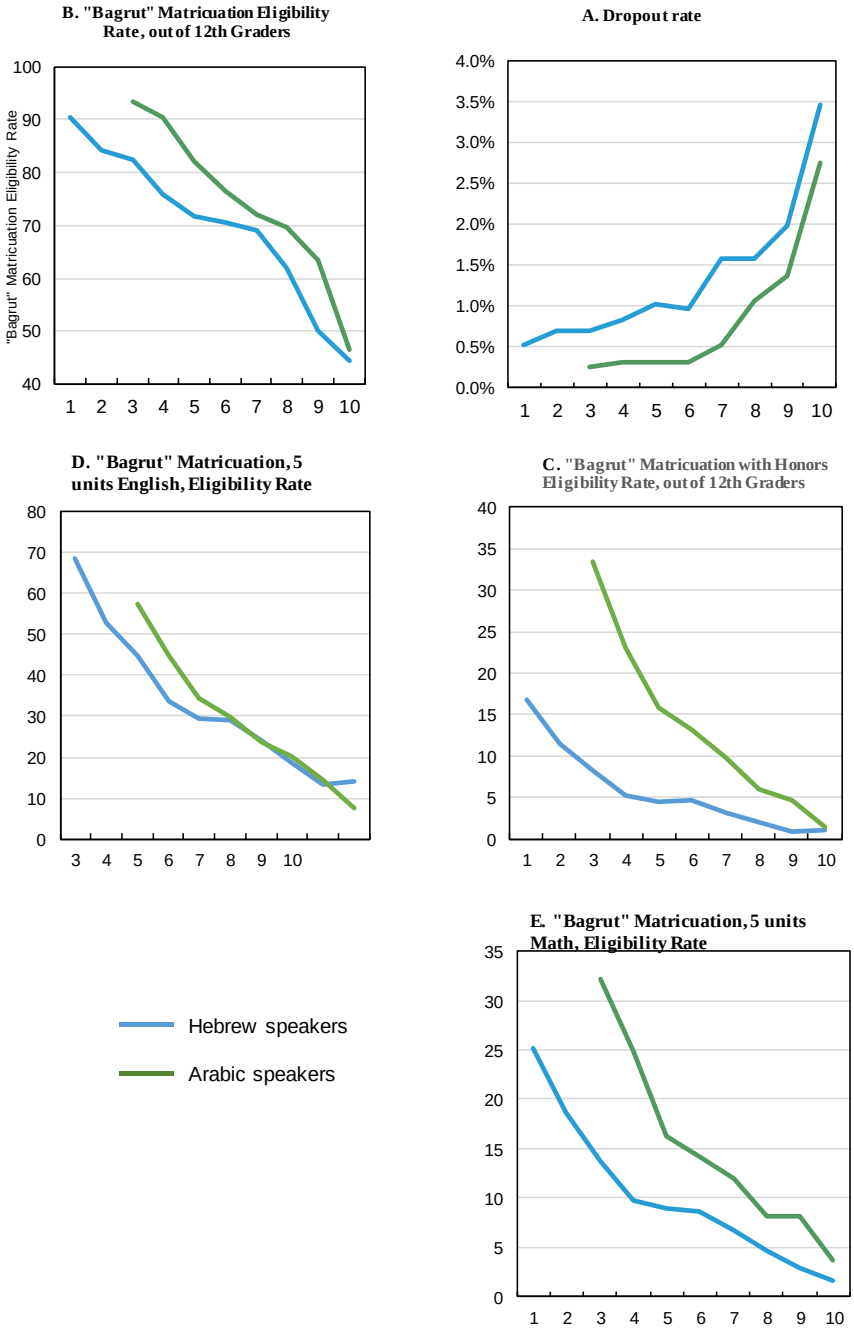
According to the Ministry of Education, most of the budgeting gap in high schools is due to unique additions for students in the State-Religious education system (many hours, extra Jewish studies, etc.), from the disproportionate allocation of high-quality special classes among Hebrew speakers (Gifted students, MABAR, ETGAR, HILA, TOB, etc.), and differences in teacher characteristics that affect wages (such as seniority and Master's degree).[13] Another explanation for the gaps lies in differences in the courses of study, in particular the high representation of Hebrew speakers in the scientific technology fields, characterized by high costs.[14]

Despite the low allocation of resources, in almost all deciles of the nurture index (Figure 3), the average achievement of Arabic-speaking school students exceeds that of the Hebrew-speakers. In some of the variables, the achievements of students in Deciles 3

[13] Ministry of Education (2019), Key Findings of the Education Budget Transparency System – 2019.
[14] Hadas Fox, Guy Yanai, and Nachum Blass (2018) Techno-Vocational Education: Trends and Developments in the Years 2006–17, Taub Center for Social Policy Research In Israel.

and 4 of the Arabic-speaking schools (approximately 9 percent of the institutions) are even greater than in Deciles 1 and 2 of the Hebrew-speaking schools (approximately 28 percent of the institutions).

Figure 3
Distribution by Sector and Nurture Deciles in Several Outcome Indices in Secondary School, 2014–18, "Transparency in Education" Findings



SOURCE: Based on Ministry of Education, the Educational picture: Upper secondary school.

Similar results were also obtained by using an econometric model that compares the achievements in high schools with the same nurture index from different sectors. The database is taken from the "Transparency in Education" website, which gives access to extensive information on the educational institutions operating in Israel regarding the academic years 2014–2018.[15] To examine the sectoral achievement gaps, we estimated the following model:

$$Y_{s.t} = \alpha + \beta_1 Arab_{speaker} + \beta_2 Madad_{s,t} + \beta_3 x'_{s,t} + \delta Year_t + \varepsilon_s$$

Where $Y_{s.t}$ is the outcome variable of school *s* in year *t*. The outcome variables examined are: the students' dropout rate; the percentage of 12th grade students eligible for matriculation; the percentage of 12th grade students eligible for an outstanding matriculation certificate[16]; the percentage of those eligible for a matriculation certificate that includes 5 units of English or mathematics.[17] $Arab_{speaker}$ is a dummy variable that receives the value 1 for an Arabic-speaking school (Arabs, Druze and Bedouins) and 0 otherwise. $Madad_{s,t}$ is a set of dummy variables that represents the nurture index to which the school belongs. $x'_{s,t}$ is a vector of background variables that describe the characteristics of the school: the median seniority of the teachers, the median seniority of the teachers squared, the percentage of teachers with a Master's degree, the percentage of students eligible for study adjustments in the matriculation exams and the percentage of invalidated tests. $Year_t$ is a set of dummy variables for the relevant school year.

The dummy variable for an Arabic-speaking school represents the achievement gap between an Arabic-speaking school and a Hebrew-speaking school when considering the school's other characteristics. Its estimates are presented in Table 1, where each row represents a different outcome variable, and each column has a different specification of the model (inclusion of nurture indices, school characteristics) or a different study population (exclusion of the ultra-Orthodox). Column 1 shows that when the school

[15] https://shkifut.education.gov.il/national

[16] An outstanding matriculation certificate is a matriculation that includes 5 units of English and at least 4 units of mathematics, with an average grade of at least 90 and includes excellence in the program for personal development and social-community involvement. "Transparency in Education" website.

[17] Outcome variables were calculated according to the Ministry of Education's definition. For further details on the calculation method, see the "Transparency in Education" website.

characteristics are not taken into account, the achievements of Arabic-speaking students are significantly lower than their Hebrew-speaking counterparts (except for the eligibility rates for an outstanding matriculation certificate). Column 2 shows the estimations when considering the impact of the nurturing indicator, that is, comparing students who are in schools with similar socioeconomic status. The results in this column are reversed: and the achievements of the Arabic-speaking students are significantly greater than those of their Hebrew-speaking counterparts who have the same nurture index.

A possible explanation for the discrepancies between the similar groups in terms of the nurture index is the relative weakness of students in schools under ultra-Orthodox supervision. This is despite the fact that the ultra-Orthodox schools included in this study are only those who teach for the matriculation exams, like the other groups. In Column 3, we excluded the ultra-Orthodox schools, and there is still a significant gap in favor of the Arabic speakers in most of the outcome variables, except for the rate of eligibility for a matriculation certificate with 5 units of English (an insignificant gap in favor of the Hebrew speakers).

In Column 4, we added a set of variables that control for the school characteristics, due to the significant differences between the groups in a number of background variables that are not reflected in the nurture index, and may be correlated with the outcome variables examined: The gaps in the median teaching seniority (-3.7 years in the Arab sector), in the percentage of teachers with a Master's degree (-6 percent), in the percentage of students with study adjustments (-23 percent) and the higher rate of invalidated tests (1.4 percent) may influence the various outcome variables.[18] The inclusion of these variables led as expected to an increase in the gaps estimated in all outcome variables examined; these remained significant even after the exclusion of the ultra-Orthodox schools, but their estimated scope was reduced (Column 5).

[18] The gaps presented are in comparison to the Jewish population, with the exclusion of the Ultra-Orthodox. When the Ultra-Orthodox are included, some of the gaps are narrowed, but still remain significant.

Table 1 Estimation results, differences between Arabic speakers and Hebrew speakers

	1	2	3	4	5
Dropout rate	0.38**	-0.90***	-0.68***	-1.02***	-0.67***
Eligibility rate: Bagrut matriculation,	-9.93***	10.42***	0.83***	19.39***	16.74***
Eligibility rate: Bagrut matriculation with honors	0.01	6.78***	6.81***	8.36***	8.69***
Eligibility rate: Bagrut matriculation, 5 units English	-18.15***	2.72*	-0.80	6.90***	3.22*
Eligibility rate: Bagrut matriculation, 5 units Math	-2.22***	6.63***	4.58***	7.70***	6.88***
Nurture index	X	V	V	V	V
School characteristics	X	X	X	V	V
Ultra-Orthodox	V	V	X	V	X

The findings presented in Table 1 reinforce the hypothesis that the achievement gaps between the Hebrew-speaking education system and the Arabic-speaking system are mainly due to the difference in the socioeconomic composition between the two groups. This means that the claim of ineffectiveness in the Arabic-speaking education system in relation to the Hebrew-speaking system is not supported by the data when the comparison is focused on schools in a similar socioeconomic cross-section.

In order to address the widespread distribution of the groups between the nurture indices and the lack of overlap between the Hebrew-speaking schools and the Arabic-speaking schools in the number of schools included in the nurture indices, especially the extreme ones (Figure 2-A), we conducted a number of estimations on a small sample of nurture deciles in which both groups are significantly represented. Table 2 shows the estimate of "Arabic speaker", and the difference between the columns is the nurture deciles that were included in the estimation. In the bottom two rows, the percentage of schools included in the estimation for each group is noted: 30–82 percent of all Hebrew-speaking high schools and 12–65 percent of all Arabic-speaking high schools. From the estimation results presented in Columns 1–6, which include the weakest students in both groups, it can be seen that the achievements of Arabic-speaking students are better than those of their Hebrew-speaking counterparts in all variables, except for the eligibility for a matriculation certificate with 5 units of English studies.[19]

[19] A possible explanation for the achievement gaps in English is that the English language is the third language for Arabic-speaking students and the second language for Hebrew speakers.

In Columns 7 and 8, we examined the gaps between the strong students in both groups; in Column 7, there is an overlap between the schools in the different nurture deciles and in Column 8 we also included Deciles 1 and 2, which do not have Arabic-speaking schools. The results show that the achievement gaps in favor of the Arabic-speakers are maintained and even widened when the students with relatively strong background characteristics in both groups are compared.

Table 2
Estimation results, differences between Arabic speakers and Hebrew speakers, limited sample of nurture deciles

	1	2	3	4	5	6	7	8
Dropout rate	-0.61***	-0.63***	-0.65***	-0.65***	-0.68***	-0.73***	-0.62***	-0.60***
Eligibility rate: Bagrut matriculation,	8.80***	8.72***	7.43***	7.50***	5.94**	5.82*	11.16***	10.46***
Eligibility rate: Bagrut matriculation with honors	8.01***	8.00***	9.74***	8.68***	6.81***	6.32***	17.37***	17.20***
Eligibility rate: Bagrut matriculation, 5 units English	0.45	0.13	1.48	1.05	-0.80	-0.34	7.09**	6.77**
Eligibility rate: Bagrut matriculation, 5 units Math	6.25***	6.23***	6.83***	5.91***	4.58***	4.34***	11.69***	11.41***
Nurture indices	2-9	3-9	3-8	4-8	5-8	6-8	3-5	1-5
Percent of secondary school that are Hebrew speaker	82%	68%	61%	50%	41%	32%	30%	58%
Percent of secondary school that are Arabic speakers	65%	65%	41%	35%	32%	29%	12%	12%

*The row was calculated relative to the number of schools included in the estimation out of total schools in the relevant population.

The results presented in this study relate only to high school students. This is important to remember, because there is a gap between the two groups in the study rates (the number of students from the number of children in the age group) and it may bias the results in favor of the Arabic-speaking schools, due to the dropping out of the weak students before high school. The gap in the study rate between the groups in high school is approximately 3 percent[20], a rate that is lower than in most of the estimates obtained in Tables 1 and 2. Therefore, despite the gap in study rates, the findings presented in the box remain the same.

The Research Department's Productivity Report points to the importance of closing the achievement gap between Hebrew-speaking and Arabic-speaking students, and its implicit contribution to the future growth of the economy. The above findings show that the results achieved by the State-Arab education system are better than those achieved by the state education in the Jewish sector, at least in schools where there is an overlap in the nurture indices. Given the low resources allocated to them, the State-Arab education's use of resources seems to be effective. Therefore, a more balanced

[20] Nachum Blass (2020) – See Note 3.

allocation of resources can help accelerate the narrowing of gaps in student achievements and skills. Detailed recommendations in this regard are included in the Productivity Report, and include increasing the progressiveness of instruction hours and creating progressive teacher wages. This is to attract quality teachers to schools where the improvement of achievement is an educational challenge of primary importance. Steps to reduce budgetary gaps to the detriment of the Arab education have been taken within the five-year plan in Arab society. (For further information, see box below).

We should qualify our statement and say that in interpreting the findings of the analysis presented above regarding the Arabic-speaking schools in the higher nurture deciles (the weakest schools), the absence of a comparison group sufficiently similar in the Hebrew education system should be taken into consideration. Approximately 35 percent of Arabic-speaking schools are in Decile 10, including most Bedouin schools (75 percent). Because of the important role of the local authorities in the education system in general and in high schools in particular, combined with the many differences between the localities in the Arab society, it is not obvious that the education system in these localities is just as effective as the system in the stronger localities. However, it is argued that the above findings have weakened the opposing argument that the achievements indicate an ineffective utilization of the relatively scarce resources allocated to the Arab education system.

Government Activity under Resolution 922 in the Field of Education

Resolution 922 deals with the government's activity for economic development in the minority population in the years 2016–20, with the aim of "reducing the social and economic gaps in the minority sectors in Israel". The Resolution is implemented through a five-year plan, which involves the cooperation of 15 government ministries and local authorities in five main areas: physical infrastructure, employment and economics, education and higher education, empowering local authorities and society and community. Implementation of the five-year plan requires meeting many challenges, which has resulted in a low budget execution rate (at the authority level) – approximately an actual 33 percent of the allocation; the education field stands out favorably at a higher rate of implementation (budget execution of approximately 70 percent).

The Ministry of Education has defined a number of outcome targets that it intends to achieve in the program by 2021, including:

- Increasing the professional level of teachers in the Arab education system.
- Improving student achievements:
    - Reduction of dropout rate to 3 percent.
    - Increasing matriculation certificate eligibility rates to 73 percent of 12th grade students.
    - Increasing the eligibility rates for a quality matriculation certificate to 62.5 percent of those who qualify for a matriculation certificate.
- Increasing the number of children and youth participating in informal education activities.

The steps taken by the Ministry of Education to achieve these goals are:

- **Teacher training** – In Arab society, there is an excess supply of teaching staff (more than 10,000 qualified teachers waiting for a position). The problem is exacerbated, as every year the annual amount of training exceeds the annual demand of the Arabic-speaking education system. As a result, employment rates and extent of employment among employed persons are low, leading to difficulties integrating into the education system and even to lowering the quality of applicants. In order to meet the challenge, the Ministry of Education, within Resolution 922, has taken a number of steps related to the training of the teaching staff throughout the career stages:
    - Applicants to Teaching Colleges – Increasing the admission requirements for teaching colleges, adding tests of the knowledge of Arabic and Hebrew, expanding the program for excellence.
    - Teaching students –
        - Programs for improving proficiencies in Arabic and in Hebrew. (These are intended, among other things, to help absorb Arabic-speaking teachers into the Hebrew-speaking system, and over 1,000 have already succeeded in being integrated.
        - Expanding the amount of participants in quality practical training programs (“Academia-Kita”, PDS).

- Developing courses on identity and culture, establishing units for social involvement, and opening courses to strengthen the students' academic proficiencies.

- Improving the absorption mechanism in the system (absorption and internship)
  - Integrating quality metrics into teacher placement procedures in Arab society – A tool that is intended to help sort candidates based on achievements in the training program.
  - "Getting out in the field" in the internship workshops in "incubators" in schools and localities with the aim of adapting the training to the unique needs of the place.
- Professional development throughout the career –
  - Workshops for developing pedagogical leadership in the school (empowerment of the mid-levels); developing professional study communities – a proactive model of teachers studying various disciplines; strengthening the PISGA centers (teaching staff development) by allocating additional resources and programs to accompany the centers' staff.
- Additional steps –
  - Strengthening the teaching-support resource through the establishment of a volunteer system (retirees and students); improving teaching staff evaluation processes by accompanying administrators and training them to conduct assessments as a tool to promote teacher development;
  - Developing Arabic online courses for teacher study.
  - Simulation workshops in Arabic – Using actors to simulate various situations in the classroom.

The incremental cost of these measures is estimated at approximately NIS 56 million.

- **Improving student achievement** – Increasing the differential allocation of resources. Adding and pooling of differential hours, approximately 35,500 in elementary and approximately 21,500 in middle school, and implementation of a pilot for differential budgeting in high schools. In addition, the program includes additional budgeting for Hebrew study programs in the various education stages. The cost of these measures, most of which are not budgeted under Resolution 922, is estimated at approximately NIS 960 million.

- **Informal Education –** Within the program, informal education has begun in 76 municipalities, and the number of students taking part in these activities in 2019 is estimated at more than 91,000, higher than the goals set for the program (an updated target of 90,000 in 2021 and originally 50,000). The investment in informal education has several components:
  - Developing culturally appropriate dedicated solutions for Arab society;
  - Development of the local authority's human and physical infrastructure for institutionalizing an informal education system—appointing directors and members of the community. Establishing the school as an anchor for the community in the afternoon (classes, educational activities, young leadership, community enterprises and more), establishing 17 new community centers and more.
  - Amendment of allocation mechanisms and laws – Reducing the rate of participation in the cost required from authorities in the socioeconomic clusters 1-3.

The informal education execution rate reached approximately 85 percent in 2018, at an incremental cost of approximately NIS 130 million.