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Bagrut Exams: Issues and Recommendations for Reform

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Bagrut Exams: Issues and Recommendations for Reform

Nachum Blass*

Abstract

For a number of years, the policy objective of the Ministry of Education has been primarily to narrow the education gaps and to increase the success rate on the bagrut exams for the overall population and particularly amongst the weaker socioeconomic groups who until the recent past had lower success rates than other population groups. This policy paper shows that the bagrut qualification rate amongst populations that take the exams have indeed risen consistently; there is no evidence to support the claims that this is due to a lowering in the difficulty level of the exams. Another common claim is that the scope of study in the sciences is low in Israel. In the second part of the paper data is examined that shows that the range of study is reasonable relative to other developed countries and that there is no proof of a crisis in the teaching of the sciences in Israel. In conclusion there is a brief presentation against the bagrut exam system and a suggestion for its reform.

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1. Rate of Qualification for the Exam

Any discussion of achievements in the bagrut exams must take into account the demographic and socioeconomic changes in the age groups of young boys and girls finishing 12th grade and taking the exams. In order to get a complete and balanced picture, the size and composition of two groups must be examined: the entire cohort and the population for whom the bagrut certification has importance and significance (heretofore: the relevant population), that is the overall cohort without Haredim and Arab Israelis from East Jerusalem, of whom very few take the Israeli bagrut exams.

Separating these two groups is very important, because the first group (the entire cohort) represents the entire target population while the second group represents the entire target population from the Ministry of Education's perspective. Of course, it would not make sense to fault the Ministry of Education for not bringing pupils from East Jerusalem (citizens of the State of Israel) to success in the bagrut exams since the majority of them learn in schools that prepare them for the Jordanian matriculation exams.[1] Likewise, the Ministry cannot be blamed that the majority of Haredi boys do not continue to study in schools that direct their pupils towards the bagrut exams rather they prefer to continue in yeshivas.[2]

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[1] Nevertheless, there is definitely room to blame the Ministry of Education and the Jerusalem municipality for not succeeding – for not being interested – in building enough educational institutions to answer the needs of the East Jerusalem population. This has been discussed in a Supreme Court case (5373/08) and has not been solved to this day.

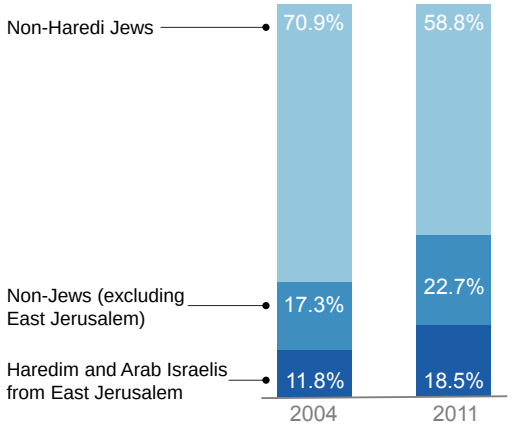
[2] Amongst Haredi girls, there is more of a tendency to take the tests, although due to the low level of their education in primary schools and ideological preferences, the rate of bagrut qualification amongst them is low. Nevertheless, for the purposes of this paper, they will be included in the relevant population from the Ministry of Education's perspective.

A rise in the rate of youth who are not included in the relevant population out of the total population naturally has an immediate negative influence on the rate of qualification in each cohort. As can be seen in Figure 1, the portion of the Haredi and Arab Israeli population out of the entire age range has increased from 29 percent in 2004 to 41 percent in 2011.

Figure 1

Distribution of 12th grade cohort*, 2004 and 2011

by sector and level of religious observance, out of the entire age group



* Those born 1987 and 1994

Source: Nachum Blass, Taub Center for Social Policy Studies in Israel

Data: Ministry of Education

Another factor that is likely to influence the bagrut qualification rate is the portion of special needs pupils out of the pupil population. In the regular state education system, the number of pupils in 10th to 12th grade has declined from 171,000 in 2000 to 160,000 in 2013, and the number of special needs pupils has risen from 1,200 to 5,000. In the regular state-religious system, the number of pupils has risen from 41,000 in 2000 to 45,000 in 2013, and the number of special needs pupils has risen from 1,200 to 3,300.

The reasons for the relatively quick rise in the number of special needs pupils are not always clear. Most probably it is due to some combination of an increase in the number of special needs and some external factors, like a change in the classification of a special population or a more liberal approach to their inclusion in the education system. It goes without saying that the inclusion of these pupils in those who are to take the bagrut exams brings the qualification rate down. Likewise, those pupils who in the past would have been considered main-stream pupils and now receive special dispensations in the exams due to their status as having learning disabilities could contribute to a rise in the rate of qualification.

What has been the impact of all the demographic developments on the rate of bagrut qualification in the past years? The data show that despite the potential for a decline in the age cohort of those likely to qualify for a bagrut certification (because of the rise in the share of the population that do not take the exams and the portion of special needs pupils), the qualification rate has risen from 46 to 50 percent (Table 1).

Table 1. **Bagrut certification data out of pupils in the age cohort, 2006 and 2012**

Population group		2006	2012
Total	% learning in 12th grade	80%	80%
	% taking bagrut exam	73%	72%
	% qualifying for certificate	46%	50%
Total (excl. East Jerusalem)	% learning in 12th grade	83%	84%
	% taking bagrut exam	75%	75%
	% qualifying for certificate	48%	52%
Jews (excl. Haredim)	% learning in 12th grade	92%	94%
	% taking bagrut exam	85%	88%
	% qualifying for certificate	57%	67%
Haredim	% learning in 12th grade	41%	48%
	% taking bagrut exam	21%	22%
	% qualifying for certificate	8%	8%
Arab Israelis (excl. East Jerusalem)	% learning in 12th grade	75%	81%
	% taking bagrut exam	70%	75%
	% qualifying for certificate	35%	42%
Bedouin	% learning in 12th grade	72%	62%
	% taking bagrut exam	60%	56%
	% qualifying for certificate	28%	29%
Druze	% learning in 12th grade	82%	87%
	% taking bagrut exam	77%	84%
	% qualifying for certificate	44%	55%

Source: Nachum Blass, Taub Center for Social Policy Studies in Israel
Data: Ministry of Education

Overall, the rate of bagrut qualification rose from 46 percent in 2006 to 48 percent in 2011. Amongst the main group of pupils who take the exams – that is non-Haredi Jewish pupils – the qualification rate has jumped from 57 to 67 percent and from 35 percent to 42 percent amongst the Arab Israelis. Amongst the Druze population, the qualification rate has risen from 44 to 55 percent. The fact that the qualification rate in general has risen less than amongst the relevant population is due to a known statistical phenomenon the "Simpson's Paradox": a situation where any component in the population leads to an improvement in achievements, but the achievements of the overall population decline – or as in this case, shows less of an improvement – because of a change in the composition of the population and an increase in the weight of those with weak achievement (in this case, the Haredi and Arab Israeli pupils).

The bagrut qualification rate that is measured at the end of secondary school, which stands at 50 percent of the overall age cohort, is not the final number, though, since a large portion (some 25 percent) of those who fail their bagrut exams at this point complete the bagrut qualification exams in following years.[3] If in future the rate of those completing their bagrut qualification stands at 25 percent, the final rate of qualification for a pupil cohort completing their studies in 2012 is expected to reach some 55 percent of the age group.

It is important to stress that alongside the increase in the rate of qualification there continue to be gaps between Jewish and Arab Israeli

[3] According to the Central Bureau of Statistics (2013), 26 percent of those who fail the exam at the end of 12th grade in 2004 were already fully qualified in 2012. Even more interesting data that come from their publication is that as the mother's education level rises, so does the rate of bagrut qualification, and by eight years after 12th grade the rate of those completing the bagrut exams out of those taking the exams whose mothers have 13 years or more of schooling in the Arab Israeli population is higher than the rate amongst similar Jewish population. It should be kept in mind, though, that the rate of those taking the bagrut exams whose mothers have 13 years or more of schooling amongst the Arab Israeli population in the given cohort was only 9 percent as opposed to 44 percent amongst the Jewish population.

pupils, between those of Asian-North African descent and those who are Israeli-born and those from Europe or America, as well as between residents of the central region and those in the geographic and social periphery. As long as these gaps are not erased, or at least considerably narrowed, the Ministry of Education cannot rest peacefully and concentrate on raising the overall qualification rate.

2. The Exam Levels and Its Relationship to the Bagrut Qualification Rate

Is there a relationship between the improvement in the qualification rate and a lowering of the exam standards and an easing of the conditions of their assessment? Over the years there have been major changes in the bagrut exams. Some have been designed to help pupils over the hurdle of the exams, in order to allow them to integrate into more prestigious tracks in their adult life. Amongst the most pronounced changes is a narrowing of the scope of the learned material for the tests (units), accommodations for those with learning disabilities[4], dispersing the exams over a number of dates, and the addition of a second and third testing date to retake the exams and improve the grade.

Nevertheless, the real question to ask regarding this is not the amount of learned material, and not even the ability to take the exam over a

[4] The issue of accommodations for pupils with learning disabilities is complicated and has many aspects. There is no doubt that there should be some accommodation for pupils with problems beyond their control that create difficulties in reading, writing or math calculations. The problem is that because of the expense in diagnosis, which differentially affects weaker populations and means that they do not benefit from these special considerations, a situation has arisen where these accommodations give an advantage to pupils in the more well-to-do socioeconomic groups. Removing the test time restriction and allowing the use of word processors – thus avoiding writing mistakes – would lessen the number of those requesting and receiving accommodations to a large extent, and would leave these special considerations for those most in need.

longer time period or with additional testing opportunities, but rather the level and depth of understanding of the material, critical thinking skills and the ability to formulate an answer.[5] There is no research-based evidence that the exam questions of today are any easier or more difficult than those of the past. In the Office of the Chief Scientist of the Ministry of Education there have been discussions as to whether there is a need to check if there has been a change in the level of the exams and to calibrate them so that difficulty levels can be compared over time, although these discussions have not resulted in any course of action. In a study that was conducted by Prof. Baruch Nevo on the subject of the effect of a second testing date the researchers concluded that it is very difficult to differentiate between a real improvement resulting from an improvement in the system and an improvement whose source is in the tests method or characteristics (Nevo et al., 2005).

The group of experts who were appointed by the Office of the Chief Scientist of the Ministry of Education has not completed its discussions and has yet to implement its study on the subject, so there is not a thorough answer to the question of the test level. Nevertheless, it is possible to point to a few findings that are likely to be relevant to the issue.

A. The Scope of the Tests (Study Units)

One of the claims that has been made is that the structure of the bagrut exams allows pupils to receive a certificate on the basis of exams in subjects that are "esoteric," like horseback riding and dog training. This is not the place to discuss the issue of whether from an educational and

[5] A group of researchers in the education field, which included amongst others the Israel Prize recipients Profesors Chaim Ader, Gaby Solomon and Miriam Ben-Peretz, have recently proposed a far-reaching recommendation to change the bagrut exam structure. The main point of the proposal is the limit the number of external exams, create a single integrative test to examine the ability to turn information into knowledge, and to change the rest of the exams into internal exams.

social perspective it is right to allow pupils to study subjects that they like, and thus to allow many who would possibly have dropped out to remain in the system. There is room to discuss whether today's pupils learn less than in the past. In this respect the data indicate clearly that the answer is negative.

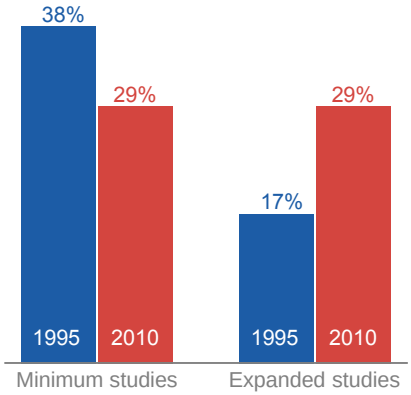
As can be seen in Figure 2, between 1995 and 2010 the number of pupils who took the minimum number of subjects and required units for bagrut certification (21 units) dropped from 38 percent to 29 percent; the number of pupils who chose to learn towards an expanded bagrut qualification (31 or more units) rose from 17 percent to 29 percent. While the rise in the number of pupils who study for an expanded qualification does not speak to the level of learning or to an improvement in the approach of pupils to the value of education itself, it does indicate that today's pupils recognize the functional importance of their studies, and do not purposely choose to do the minimum.[6]

[6] In view of this data it is interesting to ask whether the increase in pupils who do expanded studies does not create a situation of preferential budgeting for stronger pupils, who learn more units of study than their weaker peers. An additional question is whether the rise in the number of units studied has come at the expense of some in-depth study of other subjects that are not required for the bagrut.

Figure 2

Rate of those taking the bagrut exams at the minimum and expanded levels*, 1995 and 2010

as a percent of all of those taking the bagrut exams



* Minimum level studies – 21 study units,
Maximum level studies – 31 study units

Source: Nachum Blass, Taub Center for Social Policy Studies in Israel

B. Psychometric Scores of Those Accepted to First-Year Studies in Higher Education

The psychometric exam, a calibrated exam, allows comparisons between achievements over time, because the level of difficulty is judged to be equivalent. In light of this, a comparison of the level of scores of those currently accepted to first-year studies in institutions of higher education versus those accepted in the past could serve as evidence regarding the current level of those completing the formal education system today

versus years past. Table 2 presents the psychometric scores of pupils accepted to study at institutions of higher learning in 2002 and in 2012.[7]

It seems that the level over the years has not changed, although when examined more closely, it appears that the level of those accepted to first year in the universities has risen (the average score on the psychometric test has risen by 15 points from 603 in 2002 to 618 in 2012). Also in the academic education colleges, the psychometric scores of those accepted rose from 479 points to 510, while in the budgeted academic colleges there has been no change. Only in the non-budgeted academic colleges, where the rate of students has increased from 12 percent of all of those accepted to study in institutions of higher education in 2002 to 21 percent in 2012, has the level gone down (from 553 points to 532).

[7] It is important to stress that the exam is voluntary, that is, not everyone takes it. The rate of those who take the exam is determined by the requirements of the institutions of higher education (both the test and the minimum score to be accepted) as well as the pupil's own evaluation of chances of success. It is understood that anyone who does not plan on continuing onto higher education or someone who is planning on studying at an institution that does not require the psychometric test would not take the exam.

Table 2. **Psychometric scores of those accepted to first year studies**

by type of institution and field of study (selected fields), 2002 and 2012

	2002		2012	
	Number of students	**Average score**	**Number of students**	**Average score**
Academic institutions	**43,962**	**577**	**58,154**	**576**
Universities – all studies	**23,519**	**603**	**23,145**	**618**
Education and teaching	777	520	519	595
Math, statistics, computer sciences	2,148	655	1,698	661
Physical sciences	1,011	642	743	662
Biology	1,053	655	1,383	658
Engineering, architecture	3,512	661	3,616	672
Academic, budgeted colleges – all	**10,308**	**551**	**16,474**	**553**
Education and teaching	59	483	226	526
Math, statistics, computer sciences	1,248	614	1,079	584
Engineering, architecture	4,458	555	4,665	575
Academic, non-budgeted colleges – all	**5,357**	**553**	**12,217**	**532**
Education and teaching	–	–	350	377
Math, statistics, computer sciences	406	602	498	588
Engineering, architecture	77	523	41	513
Teachers colleges	4,778	479	6,318	510

Source: Nachum Blass, Taub Center for Social Policy Studies in Israel
Data: Ministry of Education

C. Rejection Rate at the Universities

Another possible indication of the level of graduates today versus in the past is the rejection rate of those applying for first-year studies at the universities. University acceptance is based on the average scores on the bagrut and psychometric test. The hypothesis is that if the level of the test has declined, many more pupils than in the past will qualify for a bagrut certificate and will be entitled to register for university, although their psychometric scores will remain low (since the score has been calibrated for many years) and so more of them will be rejected – that is if the acceptance criteria have remained the same over the years. The data, though, do not indicate this. Despite the increase in the number of university applicants (25,000 in 1990 versus 33,500 in 2010), the rejection rate has hardly changed; it stood at 23 percent in 2010 as in 1990.

It could be claimed that since the opening of the large number of colleges and competition over students (as well as the desire to keep a minimum number of students in an institution or faculty), the level of requirements has declined at the universities, and they have not raised the requirements even though they have seen the level of students declining. Today there is no research or test examining this subject, and the matter deserves an in-depth look.

3. The Teaching of Science from the Perspective of the Bagrut Exams

Claims of a crisis in the study of sciences surface from time to time. Just in the last two years in *Haaretz* and in *TheMarker* alone such esteemed individuals as Prof. Ehud Keinan, president of the Chemist's Association[8], President of the Technion Prof. Peretz Lavie, and Nobel

[8] "Why doesn't Israel have 20 Nobel prizes," Ehud Keinan, *TheMarker*, 9 October 2009, themarker.com/markets/1.555434.

Prize winner Prof. Randy Schekman (Detel, 2010), and others have commented on the subject. The main reason is their fear that Israel's economy will be harmed in its ability to compete in the global market.

Their claims that there is a reason to worry about the subject of the teaching of the sciences stem from:

A. Overall students in Israel received too few learning hours in science and technology.

B. A small portion of pupils learn science and technology, and, of them, an even smaller portion learn at an expanded level.

C. Even if many pupils would choose to learn science and technology, the system cannot support this because in many schools there is no infrastructure of teachers and facilities.

In this next section the basis for these claims and then the claim that Israel's competitive edge is tied to the quality of its human capital and that this is connected to the numbers studying science and technology will be examined.

A. Hours of Learning in the Sciences in Secondary Schools

In a critique of the education system that was published in the Taub Center Report from 2009, Prof. Dan Ben-David wrote: "The percentage of pupils studying science for less than two hours a week in school was 33 percent on average in OECD countries. In Israel the share was 48 percent – almost 50 percent more than the OECD" (Ben-David, 2010). The message is that Israel's pupils have lower achievements because they learn less science in school. This data is based on the reports of 15-year-olds who participated in the PISA exams in 2006.

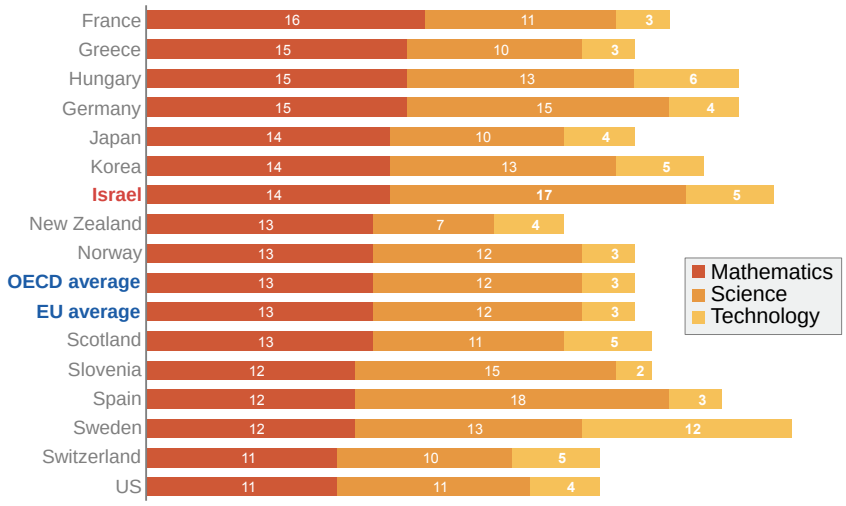
The OECD data point to a different situation. The study program in state and state-religious secondary schools includes 5-6 weekly hours of science and technology in the lower secondary school, and 2-3 weekly hours in the upper secondary schools. Study programs in primary schools also include science and technology studies at a level that is age-

appropriate for the pupils. It can be claimed, of course, that this is not sufficient or that the level is not high enough. It is also possible that some schools do not manage even these requirements, but it cannot be claimed that the number of hours of half of the pupils is less than two hours. What is more, when the number of hours devoted to science and technology in lower secondary school (ages 12-14) is examined against the OECD data, it appears that it is amongst the higher OECD countries (Figure 3).

Figure 3

Percent of learning hours devoted to mathematics, sciences and technology, 2010

as a percent of all learning hours for pupils aged 12-14, selected countries



Source: Nachum Blass, Taub Center for Social Policy Studies in Israel

Data: OECD. 2014

B. Classes, Who Qualifies and Who Excels in the Bagrut in the Sciences

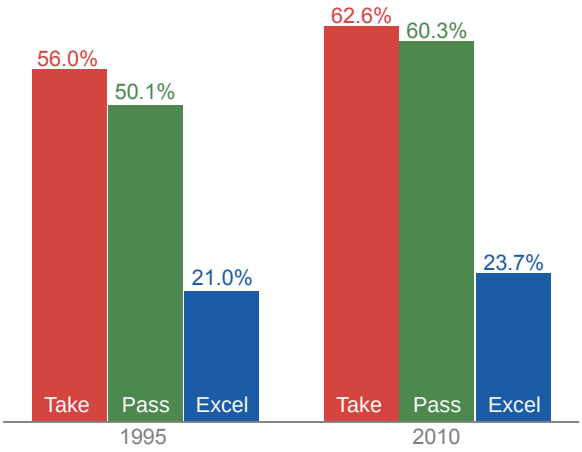
A second complaint is that the number of students in science and technology has decreased relative to the population, and that their overall number is declining. The data shows otherwise.

As can be seen in Figures 4A and 4B, between 1995 and 2010, the rate of those taking the bagrut exams in mathematics, physics and biology, as well as those passing the exams and excelling at them, has increased. As can also be seen in Appendix Table 1, the number taking the exams, those qualifying and those excelling has risen considerably more than the number of pupils in the relevant population (with the exception of chemistry where the number taking the exams and qualifying has also risen although to a level less than the increase in the relevant population). It seems, therefore, that instead of talking about a crisis in the teaching of the sciences, it would be appropriate to talk about significant achievements.

Figure 4A

Mathematics bagrut data, 1995 and 2010

rates of those taking the text, passing and exceling out of the relevant



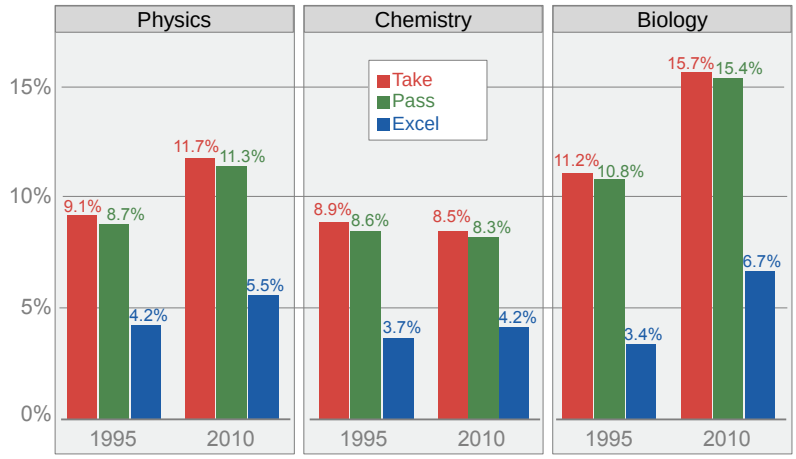
Source: Nachum Blass, Taub Center for Social Policy Studies in Israel

Data: Ministry of Education

Figure 4B

Sciences bagrut data, 1995 and 2010

rates of those taking the text, passing and exceling out of the relevant



Source: Nachum Blass, Taub Center for Social Policy Studies in Israel

Data: Ministry of Education

C. Accessibility of Education in the Sciences to the Overall Population

Another complaint about the education system that has surfaced recently is that in settlements and in many schools pupils do not have the opportunity to study science at an expanded level (Dettel, 2010). This claim is mostly right, although it ignores some basic demographic and organizational facts.

The fact that in a given settlement pupils do not study a given subject at the five-unit level does not necessarily mean that there is no opportunity to study this subject. A third of 12th grade pupils who take the bagrut exams study at settlements other than their place of residence.

Some do this because there is no secondary school in their settlement, and some do so because the school in their residential area does not match their needs or wants, and some because they have no other option (the existing school is not able to integrate them). Even in Tel Aviv, Ra'anana and Raman Gan, only 85 percent of the 12th graders who take the bagrut exams learned in their residential area in the 2010-2011 school-year. The greatest number of pupils studying outside of their residential area (46 percent) is in Jewish settlements in a mid-level socioeconomic cluster (4th to 7th decile in the scale). Arab Israeli pupils, on the other hand, tend not to learn outside of their residential settlement, apparently because of the limited number of alternatives and transportation difficulties.

The size of the school also has an influence on the accessibility of science studies.[9] For a secondary school to offer its students a wide range of study subjects, including all the sciences or most of them, it must have at least 3-4 classes in each cohort, or 300-400 pupils in 10th to 12th grade; a great number of schools in Israel are smaller than this. In 2012, 50 percent of the schools whose pupils took the bagrut exams (the relevant group for this purpose) had up to 300 pupils.[10] In the Haredi education system, 85 percent of all secondary schools that send pupils to the bagrut exams were small institutions. In state-religious schools, small schools were 55 percent; of state Jewish schools, 40 percent were small; and in the Arab Israeli sector, 36 percent of the schools whose pupils took the bagrut exams had fewer than 300 pupils. When looking at the

[9] On this issue it was difficult to find data. Until recently the Ministry of Education refused to publish bagrut data by school. The data that was available to the author was pupil data, those taking and qualifying for bagrut for 2001-2004, and data on those taking bagrut exams in science, mathematics and English at an expanded level in 2000-2009. Thus, the discussion of the level of school is subject to the limitations of the data.

[10] In 2012, there were 1,112 schools whose pupils took the bagrut exams, out of 1,584 secondary schools. Schools that did not have pupils taking the bagrut exams were primarily Haredi schools and some state schools that serve particularly weak populations, like guidance centers.

percentage of pupils learning in a school that sends pupils to the bagrut exams and has fewer than 300 pupils, the numbers are: 15 percent of all pupils, 55 percent of Haredi pupils, 15 percent of Arab Israeli pupils, 29 percent in state-religious education, and 8 percent in state Jewish education. The number of pupils in these schools is not enough for classes in all subjects at the highest level of study, and it goes without saying that the schools cannot insure full-time teaching positions in these fields of study.

In summary, regarding the issue of accessibility to science studies it can be said that in order to allow every pupil to learn science and technology at an expanded level there must be cooperation between schools at the settlement level and the sector level to help those pupils who want to study to learn outside of their settlement and to allow remote learning through the computer and internet. In fact, the Center for Educational Technology (CET) is also working in this area in a significant way.

D. The State's Position Regarding the Study of Science

Sometimes the question arises whether the state is training enough people in the areas of science and technology. When this question is linked to the issue of growth and integration in the global economy, it is accompanied by an additional question, which is the question of the importance and priority that should be given to technology education, or in other words: does the education system encourage and train enough youth to go into the sciences and technology?

Firstly, it is important to clarify that there is often some confusion between the concepts of education in science and technology and technological (vocational) training. The first refers to pupils who focus on the sciences in academic schools and high-level technology studies at comprehensive and technology schools while the second refers primarily to vocational schools per se, that focus on teaching a profession and where the academic level is much lower. In order to not harm the

prestige of technological education, the Ministry of Education tends to blur the differences.

To answer the question of science-technology training involves both an aspect of priorities and values between the learning of science and technology and the humanities as well as the aspect of how many people with these skills are really needed in the country. The problem is that for these questions there really are no answers. For the first, there is no answer because there is really no objective way to determine if learning mathematics is more important to society and the individual or more useful than learning literature. And for the second question, there is no answer because of all of the human resource projections, or at least the majority, none have proven themselves accurate, and besides, in a democratic society the ability of the state and society to determine its citizen's course of study is limited.[11]

In an interview, the head of the Ministry of Education Science and Technology Administration Dr. Ofer Rimon said that 'the Ministry of Education passes a clear message unlike in the past: to push any pupil who is able to learn high level science and technology for the bagrut" (Detel, 2010). Indeed, one of the foremost programs of the Ministry of Education today is called Reservists in Science and Technology and it serves to strengthen pupils with the potential to complete expanded studies in the fields of science and technology.

Today, only 6.5 percent of the graduates complete secondary school with such a bagrut, and the Ministry intends to raise this rate to 12 percent within five years and to 20 percent within ten years (Detel, 2010). Nevertheless, there is a legitimate question that accompanies this: for a pupil who could learn either philosophy or physics at an expanded level, should the push necessarily be towards physics?

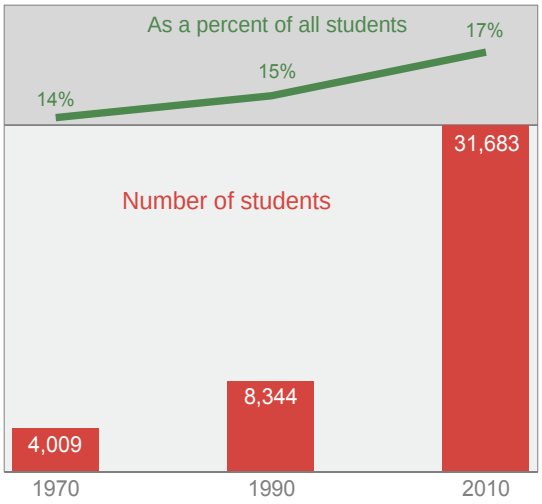
[11] On the other hand, the state can determine a core curriculum that makes 50 percent or more of the compulsory study program in the fields of science and technology, and besides the fact that it makes little sense and is impractical, it is not totally clear that at the end of the process more young people will decide to enter these fields.

Another issue is the portion of pupils learning science and technology at an expanded level, and whether their studies answer the future needs of the state. As long as there is no data regarding the rate of growth in demand for professional workers with technological skills it is difficult to answer this question. Nevertheless, if the weight of these professions in the Israeli economy does not change significantly, it seems that the data do not indicate a serious problem in the near future. The rate of students in the professions of engineering and architecture out of all students in 2010 increased beyond the 1970 and 1990 rate (Figure 5).

Figure 5

Engineering and architecture students in institutions of higher education

as a percent of all students and in absolute numbers, 1970, 1990 and 2010



Source: Nachum Blass, Taub Center for Social Policy Studies in Israel

Data: Central Bureau of Statistics

Still, there are repeated claims from industry and the military of a shortage of skilled manpower. The basic premise of this author, though, is that the central and main obligation of the education system is to answer the needs of the pupil; the needs of industry or the military or any other "consumer of education" is important but secondary to the obligation to the pupil. Thus, if the desire is to strengthen the rate of those choosing studies in technology and the professions of manufacturing, something can be done in collaboration with all the relevant bodies. There should be a separation between general encouragement towards science and technology studies – a mission that should be placed on those responsible for these studies in the Ministry of Education, like supervisors, technology schools, and the like – and encouragement to join a profession and integration into work, a mission that should be placed primarily on employers and the Ministry of Industry, Trade and Labor.

4. Recommendations for the Reform of the Bagrut Exams

The previous discussion reveals a difference of opinion regarding the system's achievements in bringing graduates to bagrut certification, but fails to deal with the critical question of the need and advantage of the exams. In this section, the issue of the need for the bagrut exams will be examined and an initial suggestion for their wide-spread reform will be proposed.

The bagrut exams are considered the final stage in formal education that is required of pupils in Israel. Taking these exams, and principally the rate of certification in the overall population, is one of the most important and accepted criteria in the country of the education system's achievements. The importance of the certificate is due to its use as a selection tool for entrance to higher education and work, a factor that raises motivation amongst pupils –the assumption being that without

these exams their efforts and investment in their studies would lessen – as well as a tool for culture and values for social cohesion in Israeli society.

The debate regarding whether the bagrut exams in their current format meet these goals, or whether they are a stumbling block to the advancement of the education system, has not left the educational agenda for decades. There are several major claims against the bagrut exams in their current format: they make the education and learning process superficial; it is impossible to evaluate a pupil's achievements over 12 years of study by a single test of memory and rote; they undermine the professional abilities of teachers who are tied to teach set material for the exams; they establish biased and unnecessary hierarchies between fields of study; they do not represent the areas of knowledge and necessary skills needed by graduates of the system in the future; running them is expensive and they cause a tremendous waste of study days because of the time devoted to preparation and repetition of material for the tests; and they strengthen processes that divide and create inequalities in the education system.

In an attempt to deal with these claims many recommendations for reform of the exams have been proposed. Yet despite all of the problems described, the majority of recommendations that have been proposed by relevant agencies and different committees have left no doubt – or at least have accepted as a necessary evil – the necessity of the exams. These proposals focused on an attempt to limit the number of tests or the number of subjects within the exam, and to change the body responsible for their evaluation (whether external or internal to the school) or the conditions of the exams evaluation (number of dates of testing, the amount of learned material, types of accommodations, and the like). Even these changes, though, do not give a complete answer to the claims against the bagrut exams.

The following proposal is no different from previous recommendations in that it, too, does not abolish the bagrut certification, but it is different qualitatively from many of the other proposals.

Structure of the Exams

The bagrut certification that is proposed would be composed of three major parts:

- **Tools** – this will include the subjects that are considered essential tools for integration into adult society from social and employment aspects for a graduate of the education system.
- **Knowledge** – this includes the other subjects, that is, core curriculum and some electives.
- **Values** – this includes an evaluation by the educational staff of the pupil's performance in a number of non-academic behavioral and value areas.

The first part of the exams would include tests in the areas of language skills (Hebrew or Arabic), foreign language (English for most pupils and Hebrew for Arabic-speaking pupils), civics, and computer skills (it should be considered whether to include in this section mathematics, and if so, at what level). The tests in the tools portion will be computerized and will be conducted at national testing centers, like the theory tests for driving. The pupils will receive a random set of test questions at a given level (the choice of starting level is the pupil's) and upon completion of questions at the given level, questions at the next higher level will begin. The tests will be based on a very large bank of questions[12], and it will be possible to give a score according to the level of difficulty and the number of correct answers. Pupils will have the opportunity to take the exams as many times as they want whenever they want, and the highest score (according to the level of difficulty) will be considered for the

[12] The question bank may be open to the public despite the claim that this allows an advantage to memory over understanding of the material. On the other hand, it could be said that knowing the answers to all of the questions in the bank proves accomplishment of the goal: knowledge of the required material.

bagrut certification. The technology exists to allow such testing at a high level of reliability.[13]

The second part of the certificate will include grades in all subject areas that the system considers compulsory, and several electives that the pupil and school decide upon. The grade will be given by the school itself and will be composed of an average of the pupil's grades in the subject over the course of the last three years of study. The learned material in each field will be compulsory and the length of the course of study will be according to an official study program, the educational policy of the school and the options available to the institution in terms of staff, physical conditions and demands of parents and pupils. In this case, also, the grade will take into consideration the level of difficulty and depth of study in the subject. The grade will be based on evaluation methods in each educational institution: end of year tests only, test and projects, independent study projects only, or any other approach that the school considers acceptable. The weight and importance of each subject will be equal. There will be no bonuses or preference for one subject area over another, and preferences that might be given at later stages will be dependent on the institution of higher learning or employers and their requirements: the Technion gives preference to the exact sciences while Bezalel or a school of bible studies would give preference to the arts or religious studies. The acceptance criteria to institutions of higher learning will be dependent on bagrut certification.[14]

The third portion of the certificate will include evaluations by the pedagogical council of the school (teachers, counselors, and the principal or vice-principal) from several non-academic perspectives: overall behavior, volunteerism, effort, diligence, relation to fellow students and teachers, and the like. Here, too, the grade will be a multi-year average.

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[13] Tests of this sort already exist in exams of specialization in medicine, as well as for acceptance to the most prestigious universities abroad.

[14] A reasonable solution will have to be found for the small number of pupils who drop out in the course of their studies and are not eligible for certification.

It is possible that this element will harm the grade for a small number of pupils, although this can be lessened or avoided by a weighting of the evaluations over a three-year period as well as by the pupil's right of appeal.

Advantages of the System

Adopting this plan of testing could achieve the following goals:

A. Preserve the value of the certificate as a motivational tool (pupils will have to devote their efforts to their studies over the entire three-year period and not just towards the exam).

B. Strengthen the independence and freedom of teachers as individuals and as part of an educational process.

C. Establish the importance of education and the value perspective in the school's functioning.

D. Preserve the certificate as a selection criterion through comparisons of external exams of basic learning skills (tools section) and other grades (knowledge section). It is clear that if the gap between external grades and internal grades is great, then institutions of higher education would give less weight to the internal school grades.

E. Save millions of shekels that are budgeted towards the process of writing and checking the bagrut exams.

F. Abolish the payment to teachers who prepare pupils for bagrut exams as well as the unjust differentiation between teachers who prepare pupils for the exams and those who teach other subjects not included in the bagrut exams.

This is, of course, an initial proposal and if its central principals are accepted discussions amongst all of the involved parties would be required.

Appendix

Appendix Table 1. **Bagrut scores in the sciences, 1995, 2003 and 2010**

in absolute numbers and as a percentage of the relevant population

	1995	2003	2010	Percent of growth, 1995 to 2010
Relevant age cohort	92,805	100,078	105,346	14%
Taking exam	51,971	67,052	65,960	27%
Passing exam	46,514	62,291	63,519	37%
Exceling on exam	19,473	32,721	24,962	28%
As a percent of relevant population				
Taking exam	56%	67%	63%	12%
Passing exam	51%	62%	60%	18%
Exceling on exam	21%	33%	24%	13%
Physics				
Taking exam	8,440	8,964	12,336	46%
Passing exam	8,102	8,812	11,916	47%
Exceling on exam	3,882	4,778	5,835	50%
As a percent of relevant population				
Taking exam	9%	9%	12%	30%
Passing exam	9%	9%	11%	26%
Exceling on exam	4%	5%	6%	38%

Appendix Table 1. **(continued)**

	1995	2003	2010	Percent of growth, 1995 to 2010
Chemistry				
Taking exam	8,268	7,336	8,983	9%
Passing exam	7,937	7,197	8,695	10%
Exceling on exam	3,390	3,991	4,447	31%
As a percent of relevant population				
Taking exam	9%	7%	9%	-5%
Passing exam	9%	7%	8%	-8%
Exceling on exam	4%	4%	4%	-6%
Biology				
Taking exam	10,362	12,765	16,574	60%
Passing exam	10,051	12,628	16,213	61%
Exceling on exam	3,109	5,740	7,010	125%
As a percent of relevant population				
Taking exam	11%	13%	16%	40%
Passing exam	11%	13%	15%	40%
Exceling on exam	3%	6%	7%	122%

Source: Nachum Blass, Taub Center for Social Policy Studies in Israel
Data: Ministry of Education

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