TORINO PROCESS

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Ministry of Education
Science and Technology
Administration

מדינת ישראל
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Ministry of Education
Science and Technology Administration

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Israel

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1. Executive summary

This document provides a survey of Israel's plans to increase the number of students in technological and vocational tracks, and in technological schools; and to invest in educational infrastructures, including advanced workshops and laboratories in schools, and regional technology centres. It also describes the 'Technicians with Matriculation' (Tech-Mat) programme, the 'Springboard to Industry' programme, programmes to develop a cadre of professional teaching staff for technological education, and refresher courses for teachers in cooperation with industry. It includes a proposal to offer special compensation to technology education teachers so that their salaries compete with those in the industrial sector. This would include remuneration for mentoring projects and developing innovative programmes.

Furthermore, it describes plans to improve the image of vocational education and training (VET) by exposing students to the world of industry and by presenting VET as a quality alternative with opportunities for matriculation. There are also plans to establish a national council for technological education in Israel with the participation of representatives of the Ministry of Education (MoE), academia, industry and the Israel Defence Forces (IDF). This council will examine the suitability of study subjects and teaching methods in relation to the needs of the economy and the skills required by the employment market – skills that should be provided by the education system. The recommendations of the Manufacturers' Association of Israel (MAI) for the academisation of practical engineering studies, which would enable students to accrue credits toward a degree in engineering, and the recommendations of the Eckstein Committee for closing the gaps between the levels of education in different sectors are also discussed.

The report includes in-depth exploration of the plans to strengthen technological education in the national religious, ultra-orthodox and Arab sectors, as well as in new immigrant communities. There are also plans to advance the education of girls and to reduce the educational gaps between the peripheral areas and the urban areas in the more prosperous centre of the country.

1.1 The structure of technological education in Israel

VET in Israel takes two distinct forms – scientific-technological education and vocational-technical training. The Ministry of Education (MoE) is responsible for scientific-technological education through the Science and Technology Administration, while the Ministry of Industry, Trade and Labor (MoITL) maintains secondary school frameworks that provide vocational-technical training according to the frameworks mandated by the Apprenticeship Law (1953) and the Youth Labor Law (1953).
The vast majority of students in Israel study in schools under the supervision of the MoE. At the same time, the study frameworks of the MoITL operate a separate system of pedagogical and professional inspection through the Department for Apprenticeship and Youth in the Senior Division for the Training and Development of Human Resources. These frameworks are designed to offer a second chance to students who have difficulty in assimilating into the comprehensive schools under the supervision of the MoE.

1.1.1 Vocational training for high school graduates (13th–14th grades)

Under the supervision of the MoE, continuing studies complement the technological education of graduates, qualifying them as technicians and practical engineers, and enabling them to integrate into the IDF and industry with a higher level of education, preparedness and training. They can eventually complete their studies towards a Bachelor's degree. The MoITL operates a parallel post-secondary programme for students who have completed their studies in schools that are under MoITL supervision.

1.1.2 Vocational training for adults

The objective of vocational training for adults (21+) is to cater for both professionals and non-professionals who wish to learn a trade or acquire a new one, or to upgrade their existing skills and knowledge to improve their chances of employment and their earning potential.
Adult training is supervised by the MoITL's Senior Division for the Training and Development of Human Resources, and includes five tracks:

- transition from vocational training to academic study;
- training adults: a daytime track for job-seekers and a 'business' track for retraining, as well as evening classes for the general public;
- training in industry and construction;
- advancement of women and the development of employment skills;
- implementing the Law for Discharged Soldiers on completion of National Service.

The Institute for Training in Technology and Science (ITTS), within the framework of the MoITL's Senior Division for the Training and Development of Human Resources and in cooperation with the MoE and the technicians' and practical engineers' trade union, supervises the training of technicians and practical engineers in technological-engineering subjects. The institute confers qualified technician and practical engineer diplomas.

1.2 Scope of technological education

According to the Central Bureau of Statistics (CBS), as of the 2008 school year the scope of studies in technological education was as follows.
In the technology tracks supervised by the MoE, approximately 115 764 10th–12th-grade students studied in 18 different study tracks (for details, see Appendix 1). In addition, some 4 600 students studied in the technician and practical engineering tracks in the 13th and 14th grades; these students are directly integrated into the labour market, or work within the army in their acquired profession. In the technological track, around 33% of 12th-grade graduates continued on to academic studies at universities or colleges within eight years of graduation, whereas in the liberal arts tracks the figure was around 55.6% (for details, see Appendix 3).
Within the framework of vocational training for young people, which is supervised by the MoITL, approximately 13 485 students studied in the 10th–12th grades. This figure includes young people enrolled in two-year vocational courses (for details, see Appendix 2).
Data from the Manufacturers' Association of Israel (MAI) indicate that there is a considerable shortage of technicians in Israel, estimated at around 5 000 (Knesset Research and Information Centre, 2008). This shortage is the basis of the claims that vocational and technological education in Israel needs to be expanded and strengthened to meet the requirements of industry and the economy. IDF data suggest that in recent years there has been a continuous decline in the overall total of technological education graduates, especially in terms of the number of deferred army service technology graduates.

1.3 The technological education vision

Against the backdrop of rapid changes in the world of technology and Israel's place in this process, the country aspires to adapt its technological and vocational education to international standards, and to the needs of the national economy, industry and the IDF.
In 2010, after years of budget cuts in vocational education, Israel is making technological and vocational education a national priority and setting objectives accordingly.

1.3.1 Objectives of the Ministry of Education

Over the next five years the MoE aims to increase the number of students pursuing technological and vocational education from the current rate of approximately 37% of the students in high school to 42% within four years, and to 46% within six years (the average in OECD countries). The main growth will be in areas required by the economy, industry and the IDF. Within four years, the objectives of the programme for technicians and matriculation will have been achieved (for details, see Section 3), and some 2 500 12th-grade graduates will hold both a technician certificate and a matriculation certificate. Within four years, the proportion of those eligible for a matriculation certificate will reach 68% of the total turnover of students. Within two years, learning environments and curricula will be adapted to better suit their role in the culture of technology and communications in the 21st century.

1.3.2 Objectives of the Ministry of Industry, Trade and Labor

The objectives of the MoITL include:

- developing human resources for the benefit of a modern economy and according to its requirements;
- training young people in programmes that combine study and work;
- training practical engineers and technicians in colleges;
- training adults who wish to obtain a vocational qualification or to reinforce within their profession;
- developing work skills;
- reducing the social gaps in Israel by increasing the level of participation in the workforce and reducing unemployment among disadvantaged groups;
- alleviating the production bottle-necks resulting from the lack of skilled workers in required occupations;
- regulating and setting professional standards in human resource training;
- planning, organising and providing pedagogical support for the monitoring of training programmes, qualifications and professional promotion.

With the assistance of an advisory committee on traineeship, including the participation of representatives from the MoE, the MoITL, technological networks, academia and industry, the MoITL is currently considering updating the hierarchy of vocational classification in Israel in keeping with international standards (EUROPASS, ECVET and EQF).

2. VISION AND CURRENT SITUATION IN VOCATIONAL EDUCATION AND TRAINING (VET)

This section surveys Israel’s national vision, the changes that have taken place over the years, the order of priorities and the main difficulties to be addressed.

In Israel, as in many other countries, the issue of vocational education has been directly linked to the key problems relating to socioeconomic policies. As part of the education system, VET makes an essential contribution to meeting the requirements of the economy in the light of evolving technology and increasing vocational labour shortages. VET is an alternative channel that enables individuals to develop a sense of self-efficacy and to utilise their personal potential, while conferring values of work, positive accomplishment and creativity. Moreover, it is a key to international growth.

Israel is a country of immigration that is committed to nurturing its human capital; vocational education, and the acquisition of a vocation, increase the earning potential and improve the socioeconomic status of the individual. Furthermore, the positioning and encouragement of technological education and its conformity to international standards will increase production and avoid the necessity of transferring it outside Israel.

After years of budget cuts, in 2010 the country is restoring VET to the national agenda and setting objectives accordingly.

2.1 Prospects for the development of technological education in Israel

2.1.1 Profile of the ideal graduate

Ideal graduates are those who can successfully face the future challenges of science, industry, technology, economics, or any other combination of chosen areas. They must possess analytical thinking skills, creativity and initiative, with flexible skills to enable them to adjust rapidly to the shifting requirements of the industrial world and the 'global village'. Such graduates will not be deterred from facing complex, multi-faceted problems and multi-disciplinary situations. Ideal graduates must display leadership qualities and be able to function well as members of a team.

2.1.2 What will technological education contribute to its students

Technological education will develop the ability to implement theory in real-world technological systems, and develop students' potential for technological innovation and creativity. It will encourage multi-disciplinary thinking in science and technology, as well as the ability to solve open questions in fluctuating situations. It will also develop a deep understanding of information and communication technology (ICT) and enhanced technologies. Furthermore, it will strengthen creativity, imagination and the ability to 'think outside the box' – which is a key attribute in hi-tech environments – and develop the capacity to analyse data and draw conclusions. Technological education will also strengthen students' ability to communicate and derive satisfaction from teamwork. Students will gain a better perception of the 'big picture' through continuous learning combined with research and development and practical experience. The students will be better prepared to function as responsible citizens and to take responsibility for their own financial, health and social affairs.

2.2 Ministry of Education – Science and Technology Administration

2.2.1 Vision

Against the backdrop of technological changes in the world, and of Israel's place in this process, there is a need for graduates with a high-level background in technology. The provision of a scientific-technological infrastructure and experience in leading engineering professions in high schools will enable graduates to be integrated into the advanced technological organisation of the IDF. They will also serve as the driving-force in the Israeli hi-tech industry, and will ultimately spearhead advancements in elite technologies.

A strategic plan for strengthening technological-vocational education has been submitted to the Israeli Knesset by a representative of the MoE. The proposed plan is to be implemented from 2010, with the objective of expanding the scope of technological education and improving its quality so that it constitutes an attractive alternative to academic education.

2.2.2 Objectives of the Ministry of Education

The key objectives of the MoE include:

- advancing students' academic achievements while utilising the potential of every individual;
- inculcating knowledge in its broadest sense**,** and imparting skills such as thinking strategies, study competencies and the social values that are required in modern society;
- closing gaps in academic achievement by promoting and supporting disadvantaged students;
- adapting the learning environment and curriculum in the education system to the best practices in technology and communications in the 21st century;
- aligning technological and vocational education to international standards, thus providing a solution to national needs as required by the economy, industry and the IDF.

Around 34% of high school students currently pursue technological and vocational education. This is expected to increase to 42% within four years, and to 46% within six years (the average in OECD countries). The main growth will be in those areas that are required by the economy, industry and the IDF.

The target for Tech-Mat students (for details, see Section 3) will be achieved within four years, and some 2 500 graduates will hold both technician and matriculation certificates. In addition, the rate of students completing 12th grade who are entitled to a matriculation certificate is expected to reach 68% within four academic years.

Within a year, all existing syllabuses will be reviewed and modified in keeping with the changing educational reality. Elective subjects in senior high schools will be reduced by 25%: there are currently 87 subjects. In addition, the education system will address the issue of dropouts from academic subjects deemed 'difficult' and the move to 'easy' subjects.

At the end of five years, the infrastructure across all education systems and learning environments will be appropriate to the 21st century, in line with the national ICT programme.

2.3 Ministry of Industry, Trade and Labor

2.3.1 Vision

The vision of the MoITL is:

- to lead the social economy of Israel; Reducing gaps
- to encourage growth and to bring sustainable development to the economy and to outlying regions;
- to encourage the transition from traditional to state-of-the art industry;
- to raise the status of employees, employers and consumers;
- to join the world's top 15 states in terms of gross national product within 10 years.

2.3.2 Priorities and objectives for vocational training

The key priorities and objectives of the MoITL include:

- developing vocational human resources for the benefit of a modern economy and in accordance with its needs;
- training young people in tracks that combine study and work;
- training practical engineers and technicians in colleges;
- training adults who wish to acquire or upgrade their vocation;
- developing work skills;
- closing the social gap in Israel by increasing participation in the work force and reducing unemployment among disadvantaged populations;
- eliminating production bottle-necks resulting from shortages of essential skilled professionals;
- regulating and setting professional standards in human resources training;
- providing organisational and pedagogical support, and monitoring training, certification and the professional development structure in private schools (without financial support).

2.3.3 Position of the MoITL regarding VET in high schools

The MoITL provides vocational education for 14 000 young people aged 15–18, as well as adult education. With regard to vocational training for young people, the MoITL considers itself to have an essential advantage over any other entity and to possess the most appropriate tools for this task, both in terms of vocational education and from a social point of view. This advantage stems from the MoITL's methodology, whereby apprenticeship training is carried out in real work settings with close linkages to the needs of both young people and industry. This training improves students' self-esteem, fosters a sense of competency, and even produces certain economic benefits.

The MoITL's principles for the future of vocational training for young people include the following.

- Apprenticeship will be centralised through educational training for young people, so that there will be no limit to the number of students in this system.
- The MoITL will use its authority to set a minimum number of apprentices that each employer is obliged to take on.
- Full authority will be granted to the Youth Section in order to centralise vocational schools.
- The MoITL will formulate and pass a Vocational Training Law that will include the organisation of youth training. Within the framework of this law, employers will be required to participate in the training of professionals. Those who do not participate will be required to pay a fee.
- The legal and public status of the 'Trainer Employer' will be established. Such employers will receive special benefits from the government in recognition of their willingness to contribute to the vocational training of young people.
- The MoITL will allocate a significant dedicated budget to the construction of vocational schools and their equipment.

- The **MoE** will confirm full recognition of the Apprentice System. The involvement of local authorities in vocational schools will be set out.

  In view of what has been mentioned above, and with the firm belief that vocational education does not deprive or hold back the development of young people, on the contrary, in view of the requirements of the market, the Ministry of Industry, Trade and Labor deems that the scope of vocational education by the way of apprenticeship should reach about 10% of the annual rate of high school enrolment, and there is a need to significantly enlarge the framework of apprenticeship and to increase threefold the budget and the attention given to the issue.

  – from an interview with Dr Ronny Bernstein, Head of Youth and Apprenticeship, MoITL

3. EXTERNAL EFFICIENCY: ADDRESSING ECONOMIC AND LABOUR MARKET NEEDS

This section addresses:

- the main economic challenges for vocational education policy in Israel and its appropriateness for the requirements of industry and the market;
- the involvement of factories and companies in vocational training;
- the promotion of training of graduates and adults – facilitating the process and offering incentives to adults;
- support for professional careers;
- the obstacles and barriers standing in the way of keeping up with the rapid changes in the requirements of industry, including recommendations for action to tackle this issue.

With regard to the relationship between VET policy, the economy and the labour market, Dr Ronit Ashkenazy, Director of Pedagogical Management in the AMAL - education network of colleges and high schools for technologies, sciences and arts, made the following statement.

> *Concerning the three economic challenges guiding vocational education policy, there is an essential difference in the question of whether we are dealing with vocational education or scientific-technological education. When speaking of scientific-technological education, the economic factors that guide the curriculum are the ability to compete in the international market, and the development of the hi-tech industries that spearhead Israeli industry. When dealing with vocational education, we address the removal of production obstacles and barriers created by a manpower shortage and finding gainful employment for the citizens of Israel.*

The involvement of factories in the formulation of policy is achieved, among other activities, through cooperation with the Manufacturers' Association of Israel (MAI). The MAI has an Education Committee whose role is to recommend and support projects and programmes in cooperation with the education system. Within this framework, the MAI (in cooperation with the MoE) and the ORT and AMAL technological education networks conducted the Tech-Mat project (technicians and matriculation), which was developed by ORT Israel.

A framework is currently being established for coordination between the MoE, the IDF and industry in order to adapt trades, curricula and skills to future requirements. Within this framework, emphasis will be placed on electrical engineering, electronics, computers, biotechnology, industrial design, plastics and other similar subjects.

It should be noted that the advanced technical organisation of the IDF demands more in terms of both quality and quantity from year to year. The IDF serves as a platform for training, providing extensive and highly valuable experience for subsequent employment in the civilian workplace. Moreover, it fosters important skills and expertise that are independent of content, such as the ability to learn on one's own, teamwork, innovative thinking, the use of English as a functional tool in the international arena, awareness of other cultures, and the ability to reach decisions in uncertain conditions.

3.1 Tech-Mat programme

The MoE is in the process of completing an up-to-date programme for promoting vocational and technological education in response to the vocational and national requirements of Israel. As part of the general plan, since 2006 the MoE has been operating the Tech-Mat programme (technicians and matriculation). Developed by ORT Israel, the programme is run in cooperation with the MAI, the IDF, and the ORT, AMAL and AMIT networks (see Appendix 6 for details on the educational networks), as well as in municipally run schools.

Tech-Mat is an example of an attractive programme that has an objective to confer on 12th-grade graduates a matriculation certificate and a qualified technician diploma in a trade that is in demand in the economy, such as electrical engineering or mechanics. The programme was developed from an integrative perspective, including with regard to its approach to the workshops required to provide experience and carry out the final project. It also takes into consideration anticipated human resource requirements and changes taking place in EU countries and the OECD.

The objectives of the Tech-Mat programme are to:

- increase the number of students enrolled in scientific-technological education;
- identify students who have the potential to study technological subjects in order to meet the needs of the IDF and industry;
- open up a wide variety of future opportunities for students graduating from high school with both a matriculation certificate and a technician diploma.

Initially launched in 2006 in nine schools across the country, in 2010 Tech-Mat operates in around 100 schools, with a target to include 10 000 students. Most of the schools participating in the programme are located in the country's peripheral areas (those outside the main towns and cities). Many of the participating schools are in minority (non-Jewish) sectors; this is part of a national effort to provide tools that will enable minority graduates from technology education to be better assimilated into the workplace.

Table 1: Students enrolled in the Tech-Mat programme, 2006–07 to 2012/13

School Yr Grade level	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
9th grade: Classes Students	9 225	30 750	56 1 400	100 2 500	100 2 500	100 2 500	100 2 500
10th grade: Classes Students	9 225	9 225	27 750	55 1 375	100 2 500	100 2 500	100 2 500
11th grade: Classes Students		8 200	8 200	27 750	55 1 375	100 2 500	100 2 500
12th grade: Classes Students			7 175	8 200	27 750	55 1 375	100 2 500
TOTAL: Classes Students	18 450	47 1 175	98 2 525	190 4 825	282 7 125	355 8 875	400 10 000

(Source: Science and Technology Administration, Ministry of Education)

3.1.1 Programme components and structure

The components of the programme, which help students to complete both the matriculation certificate and the technician certificate, include:

- more intensive lessons in the 9th grade (mathematics, physics and English);
- spreading out matriculation examinations over a longer period of time;
- encouragement and reinforcement of motivation;
- studying in small groups of selected students;
- working together with industry (each school in the programme is ‘adopted’ by a factory).

The structure of the Tech-Mat track is totally different from those of the typical technological tracks. Within the Tech-Mat framework, students begin their studies in the 9th grade and complete them in the 12th grade with a matriculation certificate and a technician certificate. In the 9th grade, students are given extra lessons in mathematics, English, Hebrew and the sciences. They complete most of the matriculation examinations in the 10th and 11th grades, leaving them free to devote the 12th grade to technical studies. The students are exempt from paying any fees.

In order to familiarise the students with industry, each school is ‘adopted’ by a factory, the objective being to support the classes throughout their four years of learning, and to assist them in various ways. The adoptive factory is involved in pedagogic and professional aspects of the programme and in social and community activities, including lectures and professional tours, professional guidance for the final project, assistance to those needing it, and employing the students in the plant. So far dozens of factories and companies have taken part in this programme, including Israel Electricity Corporation (IEC), Intel, Rafael Advanced Defence Systems, ISCAR Industry, Urdan Metal and Casting Industries, El-Op Electro-Optics, Schneider, NILIT, the Osem Group and Soglowek Foods. Creating long-term links between industry and programme graduates will help these graduates to integrate into and progress in the workplace in a professional capacity following completion of their military service.

3.3.2 Achievements

The Tech-Mat programme has contributed to the introduction of new tracks, as requested by the MAI and the IDF. Furthermore, it has significantly increased the number of students enrolled in the technological tracks. Approximately 87% of the students participating in the first course successfully completed the programme, with 66% of the students participating continuing to practical engineering studies.

3.2 Programmes to promote technological and vocational education

The MoE’s Science and Technology Administration seeks to cultivate the science and technology fields by adopting the strategic policies of leading countries and adapting them to the Israeli context, with the aim of making Israel one of the top countries in this field.
Plans include:

1. Creating a reserve of scientific-technological excellence in Israel: The country’s economy is based on hi-tech industries and enhanced technologies, and Israel is interested in increasing the number of students in technology education. To this end, it was decided to develop another level in elementary and junior high schools that was dedicated to scientific-technological excellence so that in each school 25% of the students would learn in ‘scientific excellence’ classes, and this would provide a good grounding for students who choose advanced science and engineering

subjects, and who subsequently become scientists and engineers.
Objectives: A minimum of 10% growth in the rate of students sitting for matriculation examinations in advanced sciences such as chemistry, biology and physics (currently around 25 000 students) or a scientific-engineering track such as electronics, computers, software engineering, biotechnology and scientific technology (currently around 10 000 students).

2. Reviewing the technological tracks and their suitability for the needs of society and the economy: Technological education comprises three clusters of tracks: engineering, technological and occupational. Each track needs to be re-examined with regard to its provision for students and for the economy. This needs to be carried out in conjunction with industrialists and the leading economic players, while at the same time adopting reforms and processes that have proved successful in these areas around the world.
Objectives: The upgrade and adaptation of occupational and technological tracks within three years.

3. **Increasing the number of technicians and practical engineers in Israel:** The requirements of industry and the economy necessitate that more technicians be trained.
Objectives: To attain the goals of the Tech-Mat programme within four years: to have approximately 2 500 students completing 12th grade with both a technician certificate and a matriculation certificate in subjects that are essential for the economy; and to reduce the number of students who do not complete at least 14 study units (the minimum entrance requirement for 13th grade), with the aim of directing more students to continue to study towards the technician and practical engineer certificates, and providing them with more suitable options within the system.

4. **Setting up three models of schools linked to industry:** Establishing vocational schools with intra-ministry cooperation will provide vocational training graduates with professional certification in subjects needed by industry, and with industry cooperation.
Objective: To have around 450 students learning in such programmes by the end of the 2013 school year.

5. **Encourage more student participation in national and international competitions in order to promote technological fields:** These include competitions such as the 'Roboner','Robocup', FLL, mechatronics, water, product design, computer science, scientific-technological track, industrial management, bio-tech, films, outstanding student and electronic engineering competitions. The goal is to organise 15 national competitions and participate in 4 international ones.
Objective: The participation of around 1 000 students.

6. Providing retraining courses to enable academics to teach technological and vocational subjects: This involves opening new tracks to allow academics to retrain to teach technology subjects.
Objective: To carry out three retraining courses each year with the participation of 75 academics (450 hours each course). These courses will be provided in three formats:

   - **Second career** – one year of study combined with work in industry (basic studies, education, pedagogy, didactics and experience in schools);

   - **Teaching and working** – an intensive four-month course and teaching accompanied by an instructor and a pedagogic trainer;

   - **Volunteer** – 60 hours' introductory courses and practical experience.

7. **Developing educational and pedagogic leadership for technology education:** The aim is to implement in-service training, conventions and workshops to update the teaching of technology

according to latest curricula.
Objective: To provide updated refresher courses for 250 teachers in 10 courses (around 112 hours each). In addition, there will be two study days each year (around eight hours each) for principals and technology subject coordinators.

8. **Continued implementation of the reform:** The reform of technological and vocational education will be constantly adapted, including by opening new technological and vocational tracks to meet the needs of industry, the IDF and target populations (such as peripheral regions, girls, minorities and ultra-orthodox groups).

9. **Upgrading laboratories and workshops:** Each year around 100 laboratories and workshops will be upgraded; equipment and learning environments will be updated; and allocations for equipment will be increased.

10. **Increasing collaboration with industry:** Students will be involved in undertaking final projects in industry and knowledge industries, and in the IDF, and will also be offered experience in new industrial systems, in cooperation with principals, teachers and other students.
Objectives: To increase the number of students who carry out final projects in industry as part of their matriculation requirements by 25% each year; to increase the number of students who complete at least the 14 study units required to continue their studies toward technician and practical engineer certification; to expand students' horizons with regard to the potential for employment in industry within the framework of their studies in the comprehensive high schools.

3.3 Success of vocational training

The following data reflects the success of vocational training for adults and young people.

Table 3: Young people – Integration into army service and civilian life

Subject	*Young people		
Reason for joining system	Friends/family: 35%	Learn vocation: 20%	Work: 6%
Army service – 74% of graduates (male)	53% in learned vocation		
Employment among graduates of system: 61% integrated into work 23% continue education	68% of males work in learned vocation 81% of graduates of technical vocations work in the vocation for which they trained 65% of graduates of management studies work in the subject for which they trained		
Satisfaction	93% described study years as 'good' or 'very good' 65% felt they accumulated practical experience during their studies 67% stated that the system enabled them to learn a lifelong vocation		

* Survey by the ORT Network in 2005 among 550 young people who graduated in the period 1999–2004.

3.4 Obstacles and impediments – Proposals for improving the relationship between vocational education and industry

Dr Ofer Rimon, Head of the Science and Technology Administration, notes the following:

> *In Israel, the orderly integration between vocational education and industry is almost non-existent; instead it relies on local initiatives. I would like to see greater, better organised cooperation. I would like to see Israeli industrialists taking greater responsibility, particularly with respect to practical training. It would be better if more industries were integrated into technical education on one hand; and more students integrated into industry during the course of their studies, on the other hand. We lack the framework for coordinating between the Ministry of Education and parties in industry, which would lead industry to take greater responsibility for providing practical experience.*
>
> *Today, there are 11 technological tracks under the supervision of the Ministry of Education, and I call on each professional/industrial union to come forward and say 'I want to pick up the gauntlet with respect to a specific track'. Anyone who comes to us will discover a willingness to listen and to take exceptional measures. We have recently presented to the Knesset and the government a Strategic Plan for Strengthening Technological and Vocation Education, which will be implemented from the current school year. The plan's set objectives include expanding the scope of technological education and improving its quality so that it presents an attractive alternative to academic tracks. The ministry and the government attribute great importance to this plan, as evidenced by the increased budget allocated to it – about ILS 260 million for the years 2011–2012. After many years of cuts in funding and hours for technological education, a change in approach has been declared.*

According to Shimon Cohen, CPA, General-Manager of AMAL technological education network, the lack of incentive and the low level of priority given to vocational education by government ministries is an obstacle to cooperation between industry and vocational education. Moreover, there is some reluctance on the part of business to deal with youth education. According to Mr Cohen, there is disproportionate concern in Israel with matriculation achievements to suit the primary target of the MoE, while meeting the requirements of industry is usually in third place. 'If as a school principal you are assessed according to the percentage of matriculation passes, then it is clear that you will invest most of your energy on these examinations.' He points out that the schools under the supervision of the MoITL are more flexible. He notes that school curricula do not assist workers or graduates to immediately start work in industry, so that when they arrive at the workplace, employers must retrain them. 'This is one of the criticisms levelled at us from the business sector – this disengagement and lack of communication between industry and industrial education.'

When a countrywide technological network works directly with government ministries there is an effort to influence content planners to introduce dynamic learning content. However, in practice the pace is so different that there is gap of decades between the learning content, which trains students in yesterday's trades, and what is happening in industry today. Mr Cohen sums up this situation: 'We would like a method that is capable of assimilating industrial changes in education; we believe that the government should change the method. There is a need for teams that include representatives from the state, industry and education who will cooperate and maintain a permanent dialogue.'

Mr Cohen adds:

> *The main obstacles are the lack of any incentive for industrialists – tax exemption for employing students (for example, similar those for opening a factory in Development Area A), lack of tax benefits. The state, through its organisations, knows full well how to channel the behaviour of the economy according to its will. If the state channelled its policies through serious cooperation between industry and education, we would see a significant change. When the policy changes so that industrialists perceive the considerable importance, recognising the fact that this is their future generation, they will transfer financial and other resources in favour of this endeavour.*

Ron Bar Yosef, MoITL Division for Vocational Training, proposes to overcome the bureaucratic processes by routinely receiving forecasts of employment supply and demand, and advancing a law of vocational training in Israel.

Dr Tal Lotan, Director of Technological Education and Vocational Training at the MAI, notes: ‘A comprehensive and thorough government programme is required to promote technological and vocational education in Israel. A programme is needed that will bring young people closer to industry.’ A public council needs to be established for the promotion of technological-vocational education in cooperation with the MoE, the MoITL, the technological education networks, the MAI, industrialists, academics, labour unions and the IDF. The objectives of the council will include:

- formulating strategy and policies for technological education (in schools supervised by the MoE and MoITL);
- devising operational programmes for promoting technological education (including lobbying and legislation, and providing incentives for students through the academisation of practical engineering studies);
- encouraging research on technological education and learning materials in Israel and around the world, defining future directions (subjects and learning tracks, future skills), devising new teaching methods and updates, and changing the image of technological education among students, parents, teachers and decision-makers.

There must be a substantial increase in the scope of studies in the technological tracks in the technological-vocational schools, at least to correspond with the average levels in OECD countries.

It will also be essential to adapt the technical subjects offered, and the skills and expertise gained by students, to the requirements of the economy; to make substantial investments in advanced workshops to enable students to practise and gain practical experience; to ensure that there are sufficient numbers of teachers in technological-vocational education in the future; and to change the image of, and market, technological-vocational education.

In particular, it will be important to establish a public committee for the promotion of technological-vocational education in cooperation with the MoE and the MoITL, the technological education networks, the MAI, industrialists, academia, the labour union and the army.

3.5 Summary – External efficiency in relation to economic and labour market needs

There are three main economic challenges:

- coping with international competition;
- meeting the needs of the local economy by increasing the number of graduates from technological-vocational tracks, including technicians and practical engineers;
- increasing cooperation between industry and the education system.

The proposed solutions include:

- implementation of the Strategic Plan for Strengthening Technological and Vocation Education;
- ongoing update of curricula and their adaptation to innovations in technology;
- increasing the number of students who opt for technological-vocational studies (with the objective of increasing the number of students in these tracks from 34% to 46% of the total number of students);

- reinforcing the tracks that lead to technician and practical engineering certifications;
- training teachers in industry;
- integrating students into industrial workplaces
- establishing a framework for coordination between educational systems and industry – a public committee for the promotion of technological-vocational education.

4. EXTERNAL EFFICIENCY: PROMOTING EQUALITY AND ADDRESSING SOCIAL DEMANDS FOR EDUCATION AND TRAINING

This section addresses:

- the major social challenges that guide vocational education policy;
- the rate of success of vocational education to meet these challenges;
- the measures taken to improve the image of vocational education and to enhance its appeal;
- the measures taken to ease the movement of graduates of vocational schools to academic studies, and to reinforce their professional standing over the long term.

It also explores the degree to which vocational education offers equality of opportunity to every citizen, including disadvantaged populations, and enables them to earn a decent income and create a horizon for development. What activities are planned to achieve these objectives?

Most of the major social challenges that guide vocational education policy concern the reduction of social gaps: reducing the gaps between the periphery and the more affluent centre; reducing the gap between different sectors of the population, including between immigrants and native-born Israelis; and, of course, providing a general education and knowledge base that will prevent the creation of a class consisting only of manual workers and that will offer individuals employment mobility and the chance to progress their personal life. On the other hand, in terms of scientific-technological education it is general knowledge that represents the way of dealing with the social gap. The matriculation certificate that enables students to enter colleges and universities paves the way for social and job mobility, and integration in industry. Today, a student can attain a college-level education in gradual stages. The student is first required to gain a matriculation certificate with the minimum of 15 study units that are required to study to be a technician. Success in this path opens the way to practical engineering studies, and thereafter, successful students can complete a B.Tech engineering degree at an academic college.

In order to maintain and strengthen professional standards in the long term, an Apprenticeship Committee has been given responsibility for establishing the title of ‘Craftsman’ and ‘Major Craftsman’, as is the convention in EU. Attaining these titles requires practical experience in the workplace as well as the successful completion of refresher courses. The completion of refresher and training courses by employees in the workplace or at college also improves profession standards and strengthens lifelong learning.

4.1 Strengthening all sectors of the population

4.1.1 State religious school sector

According to MoE data, 13.4% of the high school population are enrolled in state religious schools (48 388 out of around 360 000 students nationwide who are in upper secondary schools: 23 639 boys and 24 749 girls). Around 31.4% of students in the state religious schools learn technological subjects (15 177 of the 48 388 students: 7 792 boys and 7 385 girls). Approximately 20 000 students study in schools in the AMIT religious education network (for details, see Appendix 6). Furthermore, based on the present rate of growth, the number of students in this sector is expected to increase, and there is a need to consider the future employment opportunities that are relevant to this sector.

The new MoE programme to foster technological education within state religious schools includes the following plans:

- increase the number of students in technology tracks in grades 10–12 in state religious schools by a factor of 2.5 within three years, from 15 177 to 38 000;
- improve the achievements of students in technological education in state religious schools (i.e., their eligibility for a technician certificate or a matriculation certificate);
- introduce new tracks and specialities, in collaboration with industry and the IDF (see Appendix 5);
- establish up-to-date laboratories and update existing ones;
- introduce new learning tracks for technician and practical engineering studies, and for other vocational qualifications, as well as tracks to academic degrees and for teacher training;
- reduce educational gaps and enable students to achieve their employment potential.

The programme also addresses the introduction of a new track for teacher training to create a reserve of quality professional personnel from state religious schools to teach in the technology tracks. Emphasis will be placed on finding appropriate solutions for students who have different capabilities and special needs, and on establishing frameworks for training for post-secondary school studies. Encouragement will be given to teaching staff through grants, retraining programmes, and the upgrading of existing staff through continuing education.

4.1.2 Ultra-orthodox sector

Approximately 12.4% (15 177) of all the students in technology education belong to the independent ultra-orthodox sector. Within the next decade the ultra-orthodox sector is expected to account for around 25% of all the high schools students in Israel (of which there are around 100 000, according to a Taub Center report 2010). Some of the recommendations of the Eckstein Committee relate to the ultra-orthodox sector, including the aim to increase the rate of employment of ultra-orthodox men from 40.4% to 63.0% over the next decade through, among other things, vocational training for young people who are not pursuing religious studies in Yeshivas. The vision is the creation of a new employment horizon that is appropriate to the needs of the economy and industry.

The MoE and MoITL are currently preparing to absorb young people who have dropped out of the yeshiva system by integrating them into vocational training programmes. These students will be integrated into existing schools, both within the framework of classes for ultra-orthodox students and in separate schools intended for ultra-orthodox students.

For example, the AMAL education network has absorbed yeshiva dropouts, isolated young people, and those who are at-risk, just before they ‘hit the streets’. Approximately 700 boys and girls are receiving full training that includes appropriate tests and that focuses on occupational training. Within this framework, AMAL has established the first vocational school for ultra-orthodox girls in Israel, ‘Merchavia’ in Safed.

4.1.3 The Arab sector

The education system in the Arab sector has undergone many changes. Its expansion is reflected in the number of students and the size of the various learning structures. This development has budget implications that are significant both educationally and economically, and it influences the size and division of the classes, as well as the overall structure of the system in keeping with demographic developments and higher levels of learning.

The gaps in respect of culture and learning in this sector are very wide. Many students come from homes where there is no tradition of education at all, and are expected to know four languages: spoken Arabic, literary Arabic, Hebrew and English. Nonetheless, in view of the considerable investment in terms of teachers, infrastructure and additional enrichment programmes at state and technological network level, students are achieving good results.

According to the Central Bureau of Statistics data for 2009 (published in October 2010), 31 263 out of total of 121 429 students in the Arab sector were studying in technological tracks under the supervision of the MoE (this figure includes students in 13th and 14th grades), while some 90 166 Jewish students studied in technological tracks.

According to the MoE, there has been a steady increase in the share of technological education as a proportion of the education system as a whole, as well as a renaissance in science and technology in four specific areas: materials science, life science, global science, and the technological science. Consequently, a large quantity of materials have been adapted and translated into Arabic for elementary and junior high schools.

The MoE has made the promotion of the Arab and Druze education system part of its general policy, and to this end has produced a five-year plan. Within the framework of this plan an additional budget of approximately ILS 250 million has been allocated for five years, starting with the 2010 school year. The issues to be addressed by the plan include:

- increasing the number of students eligible for the matriculation certificate;
- training teachers in the native language;
- developing special learning programmes;
- qualifying teachers;
- training education counsellors;
- providing refresher courses.

In addition, the plan includes upgrading 1 526 computer stations, science kits and scientific laboratories in around 30 schools; identifying gifted students; improving the quality of the environment; and connecting schools to the internet.

4.1.4 The Bedouin sector

The technology education networks have emphasised the promotion of education in the Bedouin sector in general, and technology education in particular. The integration of Bedouin people into the workplace in Israel greatly depends on them attaining a matriculation certificate and acquiring a vocation. The ORT and AMAL technological education networks have had considerable success in the Bedouin sector with a wide variety of programmes for advancement on a local basis, in schools under the supervision of both the MoE and the MoITL. Programmes implemented in the Bedouin sector include the Tech-Mat programme, and technological tracks in areas such as machinery, electricity, teleprocessing, software engineering, nursing and child care.

According to Central Bureau of Statistics data on the 2008 school year, the percentage of students eligible for the matriculation certificate in the Bedouin sector in southern Israel is 42%. The number of AMAL students in the Bedouin sector entitled to receive the matriculation certificate is between 42% and 57% (around 36% higher than the national average).

4.1.5 Reducing gaps between the periphery and the centre

Special emphasis has been placed on supporting students in the country's outlying areas in the north and south, and special resources have been diverted to these areas. For example, the national programme for teleprocessing, which focuses on skills for the 21st century, is directed mainly towards areas in the north and south, and includes equipping schools with interactive smartboards and 'smart classes' with portable computers. Israel, in cooperation with an NGO, has invested considerable resources in technology sciences in the south, and in infrastructure, supervision, training and programmes aimed at reducing gaps.

4.1.6 Encouraging girls and women to choose scientific-technological education

The results of a study conducted in August 2009 by the Midgam Survey Institute for the Council of Women Directors in Industry indicated that 23% of those in management positions in industry in Israel were women. Around 12% of factories employed no women at all. Approximately 21% of female managers in industry cited as the reason for the low number of women in management the 'low level of interest' in technological and industrial professions; 7% maintained that 'women are less ambitious'; 5% cited 'women's lack of assertiveness and self-confidence'; 11% cited 'tradition and habit'; and 2% maintained that there is a hidden agenda working against women in management.

Given that the number of women choosing to work in industry is relatively low in relation to the number of women in the population, partly as a result of their lack of knowledge and partly because of the social norms that propel boys toward such professions, there is a need for a specialised plan to expand the number of women who are subsequently integrated into industry.

In recent years, various projects have been implemented with the aim of empowering girls in different areas, including developing their leadership potential and encouraging them to choose scientific-technological subjects in high school with the objective of their future integration into these professions in the IDF and in industry.

These projects include:

- **Mathematics, Sciences and Technology** – a joint programme with the Office of the Chief Scientist, the Chief Inspectors for Technology in the MoE, and the Director for Equality between the Sexes.

- **Girls Leading Change** – a programme intended to nurture leadership and to help girls to prepare for a vocational career.

- **Sky** – a special project that enables girls to study for a practical engineering diploma in electrical engineering, mechanics and electronics, and to obtain army service deferment and funding. After mobilisation the girls receive a further three–four months' training in accordance with the special requirements of the army. They then serve in the technical services of the army in the Air Force, Ordnance, Communications or Intelligence Corps in a variety of development and maintenance positions.

- **Future Generation in Hi-Tech Industry** – a multi-year project to encourage students in general and girls in particular to choose scientific-technological subjects in upper secondary school in order to ensure their future absorption into related areas in the army and industry. Partners in this project include the Science and Technology Administration, the MAI Forum of Women Directors in Industry, and the IDF. This project is based on direct contact between the schools and an 'adopting' plant in the vicinity.

In addition, the MAI is launching Women's Initiative and Empowerment in Industry workshops. In the workshop, girls are shown the world of industry through activities in class, and hear lectures from successful women industrialists about the paths they took. The first workshop was started two years ago with around 100 classes and teaching three hours in class. In the 2011 academic year there will be six Women's Initiative and Empowerment in Industry classes during the year, and the project itself will accompany participants for three years until they have entered industry.

4.1.7 New immigrants

In order to integrate new immigrants into the technology education framework, programmes have been developed to improve students' Hebrew and, in particular, to help students from Ethiopia. These students are less aware of technological education than other students, and in order to reduce the gap in Israel, they need to be absorbed into the technological-vocational education system.

Students from the former USSR have integrated very well into technological education because of the strong awareness of this area of education in their native countries. They simply required some extra lessons and the adaptation of tests in Hebrew.

4.2 Recommendations of the Eckstein Committee

In August 2009 a committee was set up to advise the Minister of Industry, Trade and Labor. The Committee, led by the Deputy to the Governor of the Bank of Israel, Professor Zvi Eckstein, set out to examine employment policy in Israel. Participants included representatives of the MoITL, the Ministry of Finance, the Ministry of Justice, the labour union, the MAI, the Bank of Israel, the National Council for Economics and various other experts.

The recommendations were submitted to the Minister of Industry, Trade and Labor in June 2010 and reflected the vision to appoint a new function – "The Supervisor of Labor and Human Resources" in respect of the following:

- supporting sustainable economic growth through increased employment, and utilising individuals' capabilities by upgrading human resources;
- supporting the reduction of the poverty rate through increases in the earnings of the low-income population by increasing levels of employment and of their income from work.

It should be noted that the Supervisor for Labor and Human Resources will be charge with bringing together all the necessary organisations for promoting employment and the poverty objectives set by the Minister of Industry, Trade and Labor, and will shape the policies needed to achieve these goals.

According to the committee, it will be necessary to define this function a group of staff to cover the planning and monitoring of policy, in order to help fulfil the following roles:

- to routinely plan and recommend actions to the minister in order to achieve human resources objectives, and to supervise and monitor implementation in this area;
- to bring together accumulated information on the issues of labour and human resources policies and to serve as a central point of contact for employers, employees and job-seekers;

- to initiate and promote new projects in employment and human resources, including unique programmes to integrate into the workforce those populations that have low participation levels.

The committee proposes the following employment goals for the reduction of poverty:

- increasing the employment rate for the 25–64 age group from 69.9% to 76.4% by 2020;
- increasing the employment rate for the 20–25 age group from 44.7% to 56.3% by 2020.

Furthermore, the committee recommends an objective of reducing poverty between 2010 and 2020 by increasing the income of the bottom fifth of households by 10% more than the increase in median income in the same years.

The committee has also set the following targets for specific sectors for 2020:

- **ultra-orthodox Jewish men** – increase the employment rate from 40.4% to 63.0%;
- **Arab women** – increase the employment rate from 23.4% to 41.0%;
- **All the other sectors** – increase the employment rate from 77.5% to 83.0%;
- **young Arabs** (aged 20–24) – increase the employment rate for women from 20.2% to 40.0%, and for men from 61.0% to 65.0%;
- **other young people** – increase the employment rate from 45.8% to 57.0%;
- **people with a disability** – reduce the number of people who are unemployed as a result of their disability by 0.1 %.

In accordance with the recommendations of the Eckstein Committee, in 2010 the Advisory Committee of the Minister of Industry, Trade and Labor for re-examination of the Law of Apprenticeship and Vocational Training in Israel was established. It is headed by the industrialist Steff Wertheimer. A team was appointed to review the proposal to develop three levels of vocational qualification and to propose a model that would be capable of producing a stable professional pool of the high-quality employees that are needed for industry. The proposal is intended to complement the existing career tracks and to improve the balance between them. In addition to the existing tracks in Israel, most of which have an academic orientation, the committee is also examining the development of additional non-academic vocational tracks, with the possibility of mobility between them. New tracks would offer a worthwhile alternative to those who are not able to gain a place in the academic track. The proposal for a new track is designed to integrate as far as possible into the existing training system and to respond to educational, vocational and social needs and considerations, with a view to adopting international standards that are the norm in OECD states (EQF, ECVET, EUROPASS). The recommendations of the committee will be submitted by the end of 2010.

4.3 Summary – External efficiency with respect to equality and social demands

There are three main social challenges:

- reducing the gaps between the country's periphery and the centre;
- providing appropriate employment opportunities for all sectors of the population, including specially adapted solutions for Arab, ultra-orthodox and immigrant populations and for women;
- enabling each student and citizen to advance professional and personally and to make a contribution to society.

The solutions proposed include:

- allocation of resources to advance education in the country's periphery, including infrastructures, equipment and incentives to attract quality teaching personnel;
- development of unique programmes for each sector according to its needs;
- development of programmes and allocation of resources targeting under-achievers;
- operation of a programme enabling students to obtain the matriculation certificate following completion of high school;
- ability to advance in stages along the technician track with partial matriculation, with options to continue to the practical engineer diploma (the equivalent of an Associate's degree) and B.Tech programmes (an academic programme for those who hold a practical engineer certificate);
- development of tracks that combine vocational training with work in industry: lifelong learning tracks.

5. INTERNAL EFFICIENCY, GOVERNANCE AND FINANCING

This section discusses:

- the main problems affecting the internal policies of technological and vocational education systems (high percentage of dropouts, low levels of quality);
- the assessment indices for technological education, and how they are defined at policy level and in the field;
- the economic and political mechanisms that are utilised to improve quality, including cooperation, division of authority, autonomy for schools, sources of funding;
- the extent to which the reform has succeeded in persuading stakeholders to collaborate on the formulation of policies;
- the components of vocational-technological education that have potential to improve efficiency and quality, practical training, and cooperation;
- the actions that will be taken in the future to meet the challenges of vocational education and to implement it in the best possible way.

One of the difficult issues that the VET system needs to address is its poor image, especially with regard to vocational education under MoITL supervision, which is perceived as simply a second chance for students who drop out of the regular education system. The situation is better for the scientific-technological track, which is under the supervision of the MoE and is totally integrated into comprehensive schools. The MAI recommends a change in image and a remarketing of technological education in cooperation with the MoE and the MoITL, the IDF, technological education networks and industrialists. What activity needs to be directed towards students, parents and decision-makers, including by enabling graduates to accrue credits and use them to continue on to engineering studies, and by making practical engineering an academic profession.

5.1 Learning tracks and certification in technological education provided by the Ministry of Education

In line with the recommendations of the various reports on technological education, and according to a government decision on this issue, in recent years the MoE has begun to implement a comprehensive change in the structure of technological education. In order to increase the number of graduates of technological education who are entitled to receive the matriculation certificate, it was decided to widen the principle of modularity that allows each student to accumulate learning units in every subject, from one to five units according to their personal preferences and abilities. The reform of technological education was completed in the 2006–07.

In addition to the matriculation certificate, all the students in the technology route can receive a technician certificate indicating their studies in this area. Only those who hold technician certificates are entitled to continue their studies into the 13th and 14th grades in technician or practical engineering courses within the framework of the technological “soldier-student” . This is the main practical implication of the technician certificate.

The acceptance requirements for the 13th and 14th grades include 14 matriculation units (7 academic units and 7 technology units, at least 3 of which must be in a leading technology track). In the 13th and 14th grades, students have a second opportunity to complete matriculation examinations as well as technological training. In the 13th grade, students are trained to be technicians and the following year to be practical engineers. During army service, some of these students go on to work in the vocation for which they have studied, thus acquiring valuable experience for later civilian work. Good students who complete a practical engineering diploma can continue their studies to B.Tech level under ‘academic deferment’ (military call-up after completion of their studies). Training-only vocations have all but ceased to exist within the framework of the MoE; those that remain have been upgraded to higher levels.

In 2008 around 66.2% of the 12th-grade graduates who have examined in matriculation under the supervision of the MoE, were entitled to receive a certificate (see Appendix 4). According to data from the Central Bureau of Statistics, in 2009 around 33% of 12th-grade graduates in the technology track continued on to academic studies in college or university within eight years of completing their studies, compared with 56.5% of 12th-grade graduates undertaking theoretical studies (see Appendix 3).

It should be noted that one of the main obstacles to strengthening technological education is the teachers’ salary level, which is lower than the average salary in the hi-tech industry in Israel. For this reason, many talented individuals who have initiative and an innovative approach prefer to seek employment in hi-tech industry rather than in technological education (see Appendix 10).

5.2 Budget data

5.2.1 Budgeted hours per student in the technological track of the MoE

The standard allocation of hours in technological education is higher than in theoretical education. In other words, the cost of providing the required teaching hours is higher (the average annual cost of one hour per week in upper secondary school is ILS 5 700, on 2007 budget prices). The main reason for this is the compulsory study of three optional subjects in technological education – compared with one subject in theoretical studies – in addition to the laboratory time and practical hours required within the framework of the final project in technological education, which are not required in theoretical education.

Table 4: Standard hours per 10th-grade student in different tracks in 2008.

Type of education	Standard hours per student (per week)
Regular theoretical education	1.47
Scientific-theoretical education	1.53
Technological education	1.86–2.02 (depending on track)

In addition, non-salary monthly costs are higher in technological education (ILS 1 692 compared with ILS 897 for theoretical education).

From these data it is clear that an expansion of technological education without an accompanying reduction in the current scope of studies offered will require a substantial increase in budget.

The budget for vocational education for young people is the responsibility of the MoITL.

Table 5: Vocational education for young people, budget 2006–2008

2006	2007	2008
ILS 344 698 000	ILS 325 178 000	ILS 308 689 000

As a rule, the budget for vocational education in the MoITL is calculated per student; however, there is a cap on the number of students, depending on the total budget for all the frameworks.

According to an agreement between the MoITL and the Ministry of Finance, the budget is worked out on the basis of having 20 students in a class in the 9th and 10th grades and 18 students in a class in the 11th and 12th grades. The calculation is intended to create a balance between expenditures on classroom activities and the budget revenues. The implication of calculating the budget on this basis is that a classroom that is not full may cause the school to lose money, while larger classes could produce a budget surplus for the school (this surplus is usually used to pay for overheads that are not funded from other sources). It should be noted that the MoITL limits the maximum number of students in a classroom to 26 for pedagogical reasons.

5.3 The challenges for VET provided by the Ministry of Industry, Trade and Labor

According to Dr Roni Bernstein, Head of Youth and Apprenticeship at the MoITL, the main constraint is the limit on the number of students. This causes problems on several levels.

- **Social and economic problems**: Vocational schools are not evenly distributed around the country. In many local authorities no such school exists, despite the constant pressure to open more vocational schools, mainly to serve minority populations. The supply of vocational training for young people does not meet demand. This results in a lack of low-tech workers for the economy, and turns these unskilled youngsters into a burden on the welfare services.

- **Organisational problems for the educational networks and schools**: The choice of vocational study tracks, especially in small schools, is insufficient. Students are sometimes forced into tracks in which they have no interest. Additional problems include the lack of budget resources for overheads because of the low numbers of students in these classes in practice (for example, as a result of dropout); a lack of teaching positions, particularly in small schools; and the dependence of schools on quotas, which do not enable them to make long-term plans.

The MoITL can not set eligibility criteria for student quotas for those who run the school networks, nor eligibility criteria for studies for the young people. As a result, there is potential for pressure from the stakeholders and for claims of discrimination. On the other hand, unlike in previous years, there is now no difficulty in opening new schools. The MoITL is currently expanding by opening 13 new schools for the 2011 school year, and is increasing its level of cooperation with local authorities. However, the lack of budget resources for overheads puts the ministry under pressure to subsidise small classes, and requires particular monitoring to ensure the proper use of teaching hours and other scholastic resources. Another problem is the lack of a development budget for building new schools and expanding existing ones, including the lack of an appropriate budget to set up workshops in technology-rich subjects. Further difficulties are caused by the relatively small number of enterprises willing to adopt industrial schools and enable students to work.

5.3.1 Study tracks and certificates awarded by the MoITL

The vocational school system functions within the framework of the MoITL as a direct outcome of the ministry's responsibility for the development of the country's human resources, and in keeping with laws such as the Apprenticeship Law (1953), the Youth Labor Law (1953), the Electricity Law (1954) and the Employment Services Law (1959).

The vocational school system under the MoITL covers four years: 9th grade offers preparation and direction, 10th grade provides basic vocational studies and preparation for practical work and study, and 11th and 12th grades focus on specialisation, the acquisition of practical work skills, and studies toward the matriculation units that will enable students to continue their studies to become technicians and practical engineers.

Vocational schools are run by various networks, the two largest being AMAL and ORT (see Appendix 6). School provision includes 14 different areas of training and some 80 study subjects. For data on students in youth vocational education under the MoITL, see Appendix 2. On completion of all the requirements, graduates in the youth frameworks are eligible for a completion certificate in accordance with the eligibility rules for each study track. Students who have completed their studies in classified vocations or ones that have been declared by law as vocations requiring apprenticeship, licensing or certification are also entitled to a vocation certificate (see Appendix 9).

The level of students' knowledge is first measured when they enter the school (in either 9th or 10th grade), through diagnostic tests in Hebrew, English and mathematics. According to the MoITL, the results of these diagnostic tests indicate that on average, these students are two study years behind the requirements for normative classes in the education system in terms of level of knowledge, with the gap being even wider in peripheral areas.

In 1994 the MoITL decided to encourage students in youth settings to sit for matriculation exams in subjects that would advance them towards technician and practical engineering studies. In certain subjects, students can choose between MoITL final exams and MoE matriculation exams. Students who wish to take the matriculation exam in a parallel subject do not have to take MoITL final exam as well. The score received in the matriculation exam is recognised in the final calculation of that subject for the purposes of the completion certificate. All the students must still pass the practical exam.

Table 6: Exam achievements of students in institutions under the MoITL

Year of examination	No. of examinees	Number of completion certificate recipients	Percentage of completion certificate recipients
(2005)	3172	2110	66%
(2006)	3281	1818	55%

Source: Knesset Research and Information Centre, 2008, p. 19.

5.4 Summary – Internal efficiency, governance and financing

The education system faces those main problems:

- the poor image of technological education;
- the need for higher budget allocations to meet economic, social and competitive goals.

The solutions proposed include:

- increasing the allocation of government resources in order to advance technological education through the Strategic Plan for Strengthening Technological and Vocational Education;
- upgrading the level of studies and updating curricula to attract more students into technological education.

Note: The majority of students in technological education study full-time under the supervision of the MoE, whereas the MoITL supervises students who study and work part-time, as well as adult education.

6. INNOVATION, PARTNERSHIP AND ENTREPRENEURSHIP

This section discusses innovation, partnership and entrepreneurship and examines the main ways in which these are encouraged and implemented in Israel as the country looks ahead to the future. In addition, it describes how innovation in technological education affects the level of support and encouragement given by the government and other bodies, and discusses the various obstacles and indexes.

In vocational-technological education, the scientific and technological tracks and subjects are constantly being modernised and developed at the instigation of the MoE. Furthermore, the technological education networks ORT, AMAL and AMIT have Pedagogical Development Training Centres, the aims of which are to promote educational innovation, the implementation of pedagogical methods, up-to-date educational technologies and the acquisition of independent study skills in an e-learning environment. The development centres conduct professional technical education in-service courses for teachers, which are in addition to the ongoing courses offered by the MoE.

The centres serve as authorised MoE content suppliers, and develop, among other things, curricula, teaching materials and e-learning environments both for their schools and for the system as a whole. For example, ORT Israel has developed an electro-optic course that imparts comprehensive and in-depth scientific knowledge and understanding of the physics and engineering of technological electro-optic applications to students in upper secondary schools, enabling these students to integrate into related academic studies in the future. The AMAL network has developed study materials for architecture and design studies focusing on environmental development and sustainability.

Innovative specialisms have been integrated into the different technological tracks supervised by the MoE. For example, biomedical engineering and electronics are emerging as fields of interest and innovation in the medical and engineering world. Specialised studies combine fieldtrips to hospitals and cooperative ventures with the hi-tech industry in the field of biomedical engineering. The biotechnological track has introduced a specialisation in nano-biotechnology that provides a broad and deep knowledge base for understanding the essence of a multi-disciplinary applied science – biology, chemistry and engineering. The science and engineering track has developed biomedical, robotic, artificial intelligence and aerospace specialisations that include subjects relating to air traffic and living in space.

Tracks and learning programmes have been developed in two ways: the MoE Curriculum Department have produced a number of programmes; and the MoE and the MoITL have financed various groups who develop curricula and teaching materials (including the ORT and AMAL technological networks).

Furthermore, during the past two years new programmes have been developed for the EU, such as the NanoYou Project through the EU's FP7 mechanism (development and application of a nanotechnology implementation and communications programme). The programme focuses on young people from 20 European and other countries in 400 schools (over 25 000 individuals between the ages of 11 and 18 years, and 4 000 graduates between the ages of 19 and 25 years) who frequent the information centres. A consortium of nine expert bodies from seven countries joined together for this project, led by ORT Israel.

The Manager Adopts a Head Teacher project has forged an interesting bond between the MAI and schools. In this project, 100 industrial factory managers have adopted 100 school head teachers and participated in monthly project meetings. An in-depth dialogue has developed during the meetings, and this has led to a close relationship evolving between the two systems, the recognition of the needs of each organisation, and the creation of creative and professional cooperation.

According to Dr Eli Eisenberg, ORT Israel Deputy Director General for R&D and Training: 'Nevertheless, we still feel that not enough has been done and we need to continue to modernise the various fields with 21st-century knowledge and skills.'

6.1.1 'Springboard to Industry' project

The MoE's 'Springboard to Industry' project will commence in 2011. Within this framework 10th–12th-grade students will receive training in factories that are relevant to their study track. One day a week, the students will gain on-site practical experience guided by instructors from the factories themselves, rather than through simulations at school. The programme, which is run in conjunction with the National Insurance Institute, provides an alternative for at-risk young people, and aims to prevent dropout and to integrate these individuals into technical education and related industry in the areas in which they live. Seventeen schools from the ORT and AMAL networks and the Rural Education Department will participate in the programme.

6.1.2 Regional centres for industrial specialisation

The establishment of regional centres for industrial specialisation, which was initiated by the MoE and the MAI, is planned for 2011.

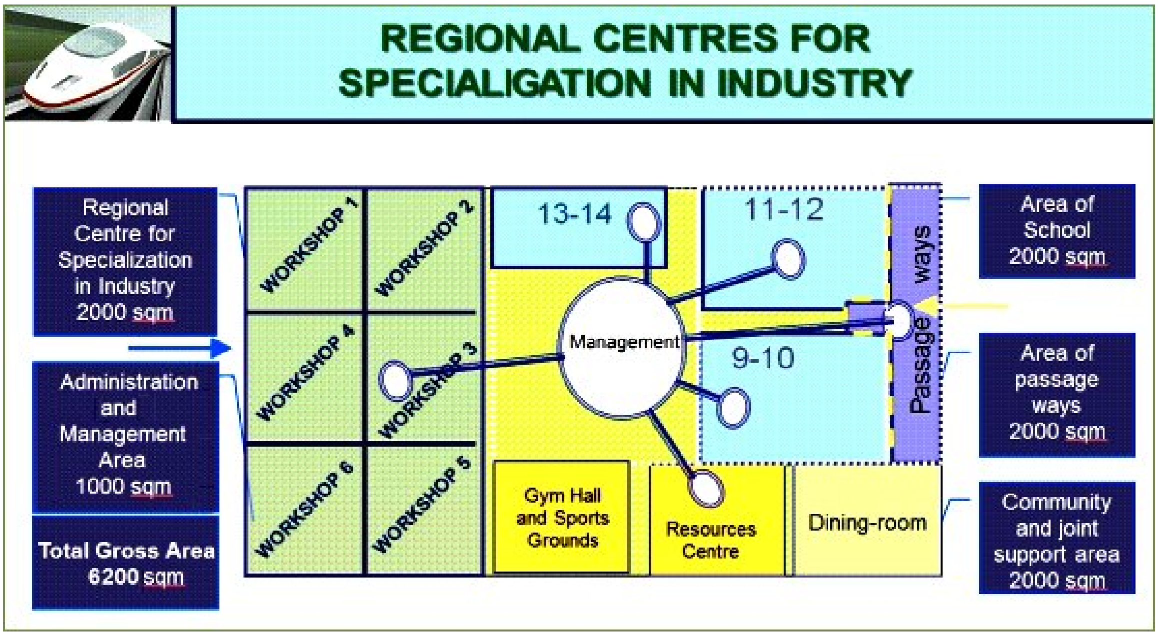
The establishment of regional/city-wide hi-tech and ICT centres, which will be similar to the Skills Academy, and which will serve as professional technological multi-age testing and training platforms, will solve the problem of the high costs involved in establishing and operating workshops and laboratories in every school.

The centre will be equipped with the most innovative modern workshops and laboratories for exercises and practical experience, and will include simulators, tutorials and remote-access teaching resources in subjects that demand expensive, technology-rich laboratories (such as mechanical engineering, robotics, automation, product design, electrical systems, electronics, electro-optics, chemistry and autotronics). The practical experience in a regional or urban workshop will be supported and guided by individuals from industry:

- training and instructing students on how to operate the equipment and systems;
- giving lectures;
- offering guidance on the final project.

The pilot project will begin during the 2011 academic year at two regional industrial specialisation centres, one in the north of the country and the other in the south.

Development of a Prototype Model for a Regional Centre for Specialigation in Industry



Source: Science and Technology Administration, Ministry of Education

6.1.3 Innovation in industry, trade and labour

Professional education, supervised by the MoITE, primarily prepares students for integration into existing industrial systems. Nevertheless, attempts are being made to adapt the training to specific types of advanced industry. For example, what was once termed ‘automobile mechanics’ is now called ‘autotronics’, and is a field that familiarises the student with advanced automobile systems.

The AMAL network has developed several innovative programmes in MoITL schools, such as a unique programme for assisting students who have learning disabilities. The programme framework uses a methodical process for identifying, evaluating and handling students in technical schools. Specially adapted teaching materials are developed that create a more effective learning process by strengthening learning skills. The programme has been running successfully for seven years in the network’s technical schools, during which time thousands of eligible students have been identified. AMAL is also introducing innovative demonstration tools using interactive Smartboards; a pilot project in five technical schools is scheduled for the 2011 school year. The schools will receive personal pedagogical and technical training and guidance.

At ORT and other schools, attempts are being made to develop and integrate innovative equipment and learning programmes. There is a plan to include renewable energies as a subject as part of the study programme in various training areas.

6.2 Operational recommendations

In order to face the challenge of positioning technological and professional education as a quality alternative to the matriculation track, the following measures will be necessary.

- There is a need to constantly develop and update curricula, including teaching and study materials.

- Initiatives and specialised programmes in schools should be developed.
- It is important to develop teacher-training systems and workshops in collaboration with industry, for example, a full year of in-service training courses in industry during a teacher's sabbatical year. The first such courses in industrial enterprises started during the 2010 academic year for technological education teachers from both the AMAL and ORT networks; they were extremely successful and their scope is expected to increase in 2011.
- A National Technological Education Council should be established, with the participation of representatives from the MoE, the MoITL, the academic community, the IDF and education professionals, with aim of creating collaboration for the advancement of technological education in Israel. This council will examine the suitability of the study subjects (including teaching methods) in terms of the market's requirements, and the aptitude and skills to be achieved by graduates from the education system in those fields of work; work to improve the image of technological education by increasing student exposure to the world of industry (for example, by dedicating one day a year in the programme to the subject of Israeli industry); consider creating academic creditation with engineering studies by making it possible to accumulate academic credits toward higher engineering studies; and rejuvenate and improve the teaching workforce in collaboration with individuals from the industrial, military and academic worlds.
- Special compensation should be considered for technological education teachers to ensure their remuneration is competitive with that available in industry. This could include awarding special compensation to selected teachers for serving as project advisers and developing innovative programmes.
- Continued support should be given to participation in and the further development of national competitions, as well as participation in international competitions, as a means of attracting and motivating students, and encouraging innovation and initiative on the part of both students and teachers.
- There is a need to continue to support, and even to increase, the budgetary resources dedicated to the ongoing professional development of teachers, the development of up-to-date learning materials, and the development of computerised learning environments.

6.3 Key indicators of entrepreneurship learning

***The State of Research and Development (R&D) in Israel*, Summary of the National Council for R&D Report 2010 (Ministry of Science and Development)**

Israel as a country is considered to have a profusion of R&D and technology. Some of the indexes used to assess a country's scientific and technological labour force place Israel in a very high position among developed countries. Israel is ranked first in the world in terms of the ratio of national R&D expenditure to gross domestic product, it is also ranked first in terms of the number of people employed in R&D in the business sector. In addition, Israel is ranked near the top of the field in terms of the number of people with secondary and post-secondary education, and in terms of the number of scientific articles published in the scientific press around the world, relative to the size of its population.

Financial research indicates a strong link between investment in R&D and innovation, and financial growth. Indeed, industry based on scientific and technological development has been considered to be the main growth engine of the Israeli market over the past two decades. Israel is known as a centre of technological initiative, and Israeli entrepreneurs enjoy large-scale financing from venture capital companies within the country and abroad. As a result of the availability of well-developed R&D systems and research personnel of a high standard, many leading multi-national companies (IBM, Intel, Microsoft, Motorola and others) have chosen to establish R&D centres in Israel.

Israel has extensive international, inter-country and inter-institutional scientific and technological connections. Hundreds of Israeli researchers participate in European Common Market R&D programmes.

Israel is a partner in many international research installations, including the European Molecular Biology Laboratory (EMBL) and the European Synchrotron Radiation Facility (ESRF). Israel also participates as an observer in the European Organization for Nuclear Research (CERN) in Geneva.

In May 2010 Israel was accepted as a member of the OECD. Since 1997 Israel has participated as an observer on more than ten OECD R&D-related committees and work groups.

The Israeli government has signed bilateral scientific and technological cooperation agreements with almost 30 countries, including the United States, Germany, France, Britain, India and China. In addition, there are bi-national research foundations that operate with the United Sates (BIRD, BSF and BARD), Germany (GIF), South Korea, Singapore, Canada and Britain.

All of the universities and several other research institutions in Israel have agreements for cooperation with research institutions abroad. The number of active agreements exceeds 500.

The National Council for R&D has analysed the R&D framework in Israel and the prevailing directions in development in order to establish a policy that will ensure the protection of the system's existing achievements and its continued growth in the future.

ANNEX: THE VET SYSTEM – SCOPE, LEGAL AND INSTITUTIONAL FRAMEWORKS AND ADDITIONAL DATA

This section includes additional data relating to the scope of the professional technological educational system, and its legal frameworks and institutions. It covers the following questions:

- What is the structure of the main system and its sub-frameworks?
- What are the system's main internal and external streams?
- What is the meaning of VET?
- What are the different tracks and their unique characteristics, including the differences between professional education and apprenticeships supervised by the MoITL, and scientific-technological education supervised by the MoE?
- What is the regulatory and political framework for controlling the various sub-systems?
- What is the strategy for adult training and lifelong learning, and what does it cover?

This annex is divided into the following sections:

- A1 Historical background and the current situation
- A2 The split between the two ministries and the number of students
- A3 The changing structure of technological education
- A4 Technician and practical engineering tracks
- A5 Breakdown of apprenticeship subjects and vocations authorised by the MoITE
- A6 Professional training for adults

A1 Historical background and the current situation

During the first few decades of the State of Israel's existence, professional and technological education was regarded as inferior to academic education, mainly because it was based on streaming (sorting students into tracks in which they were not necessarily interested, and in a manner that could preserve the gaps between social classes) and because of the matriculation access restrictions placed on students in these streams. Nonetheless, there was a recognisable and constant increase in the number of students in vocational/technological streams during that period, reaching a level of 52% of all secondary education students during the 1970s.

As a result of the harsh criticism that was directed at vocational education in Israel, in the late 1980s and early 1990s a number of teams and committees were appointed to examine this subject. In line with their recommendations, the MoE began to implement a comprehensive reform. This included cancellation of the track system; organising the vocational and technological tracks into three categories (scientific, technological and occupational) and reducing their number (see Appendix 1); broadening the technological academic base and reducing focused practical training; and allowing greater flexibility in the selection of subjects and access to matriculation examinations.

In the 2001–02 school year the reform was implemented on an experimental basis in only 20 schools. As a result of its success, it was expanded to include 120 schools in the following year. In September 2003 the MoE published a memorandum from the Minister of Education entitled 'Implementation of the Reform in Technological Education throughout the Education System', which outlined the following framework for studies in secondary school.

Group of subjects	Subject	Number of study units
Option A	Technology Sciences subject or science subject (physics, chemistry and biology)	1–5
Option B	Leading subject (main subject in the track selected by the student)	1–5
Option C	Specialisation subject (one of the specialisms within the same track)	1–5

According to the Central Bureau of Statistics, 35% of all 12th-grade students were in technological tracks in 2003, compared with 30% in 1998. In 2008, 36% of all upper secondary students were enrolled in vocational and technological education (34% in MoE classes and 2% in MoITL training classes). This figure is low compared with statistics for EU countries (65% in 2002) and the OECD countries (46%). Nevertheless, the MoE maintains that a comparison of past years is irrelevant because of the implementation of the reforms.

The technological education budget has been reduced over the past decade. However, as a result of the lack of clear separation of the budgets designated for this field it has been very difficult to track the exact extent of the reduction. The cost of technological education is higher than that of academic education, in terms of both the standard number of hours per student and the non-salary expenses. Most of this budget is included in the secondary education tuition fee budget. According to well-informed sources, such as the MAI and the ORT and AMAL technological education networks, the budget has been reduced sharply, by 33–35%, which has led to the closure of technological tracks, a reduction in the number of hours of practical experience in workshops, and an increase in the age profile of the teaching staff (Eisenberg, 2006).

A2 The split between the two ministries and the number of students

VET in Israel incorporates two different courses: scientific-technological education and vocational education.

The MoE's Scientific and Technological Administration is responsible for scientific-technological studies, while the MoITL operates a secondary education framework that provides technical vocational training, including the integration of employment, within the framework of the authority granted to them by the Educational Law (1953) and the Youth Labor Law (1953). The MoITL framework focuses on students who have been unable to integrate successfully into comprehensive schools.

The educational frameworks of the MoITL Training and Development Section's Department of Youth Training operate a separate system of pedagogical and vocational supervision.

According to Central Bureau of Statistics data on the number of students in technological education in the 2008 academic year, 115 764 10th–12th-grade students studied in 18 technological tracks supervised by the MoE (for a detailed breakdown, see Appendix 1) and in the technological education centres that were designed to offer a second chance to students who are unable to cope in comprehensive schools supervised by the MoE for educational, social or emotional reasons. In addition, 4 600 students in the 13th and 14th grades studied in the technician and practical engineering tracks and integrating directly into the labour market, or working in their chosen profession during their military service. Furthermore, according to the Central Bureau of Statistics data for 2009 (to be published in October 2010), 90 166 students studied in the Hebrew technological education tracks and 31 263 studied in the Arabic technological education tracks. This data includes students from the 13th and 14th grades.

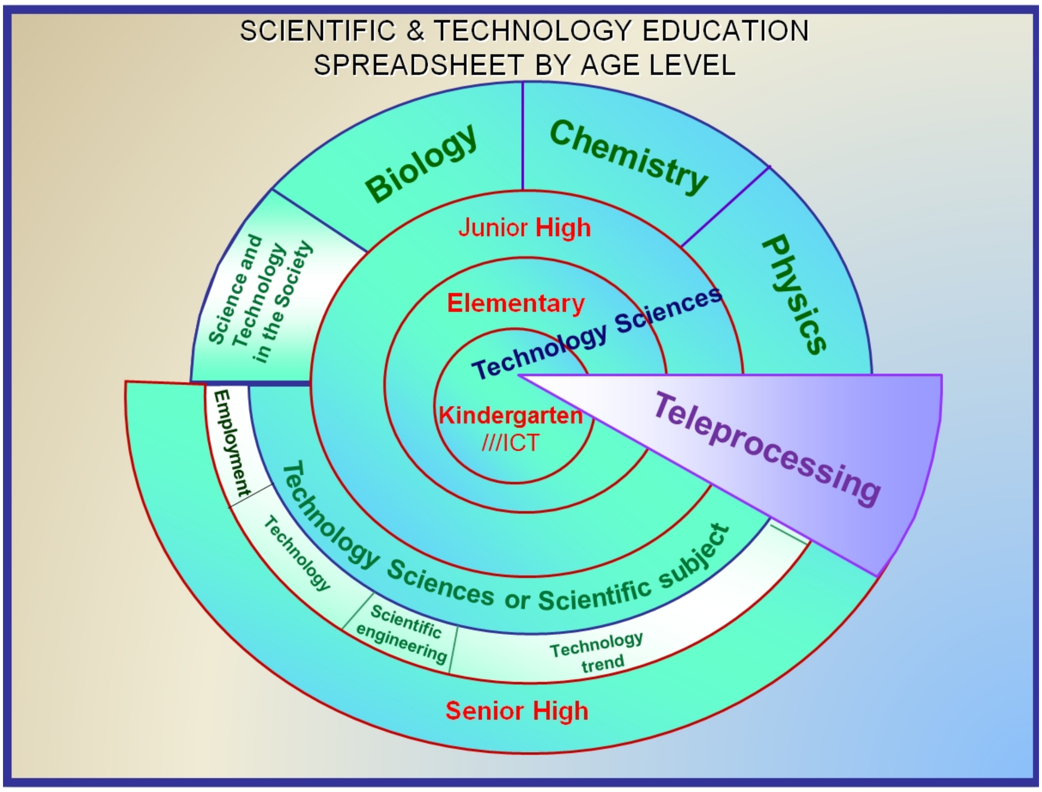
Data shows that 66.2% of the 12th- grade students in MoE-supervised institutions who examined in matriculation for the 2008 examinations were eligible to receive a certificate. Furthermore, 33.0% of 12th-grade technology study graduates pursued academic studies in colleges and universities within eight years of graduating, compared with 56.5% of 12th-grade academic study graduates (for a detailed breakdown, see Appendix 3).

There were 13 485 9th–12th-grade students studying within the framework of youth vocational education, supervised by MoITL. This figure includes young people studying in two-year vocational courses (for a detailed breakdown, see Appendix 2).

A3 The changing structure of technological education

In line with the recommendations of various committees on technological education, and with the government decision on this issue, from 2010, the MoE has begun to implement a comprehensive change in the structure of technological education. With the aim of increasing the number of technological education graduates eligible to receive a matriculation certificate among, it was decided to expand the concept of modularity that enables students in each subject to accumulate from one to five credits (points) based on their preferences and individual capabilities. The structural reform of technological education was completed during the 2006–07 school year.

All students in the technological track have the right to receive, in addition to the matriculation certificate, a technology certificate testifying to their education in this field. Only graduates who hold a technology certificate can continue their studies in the 13th and 14th grades and become technicians or practical engineers as part of the technological reserves. This is the main practical significance of the technology certificate. In the 13th and 14th grades, in addition to specialising in a technological profession, students have another opportunity to complete their matriculation certificate.



Source: Science and Technology Administration, Ministry of Education

A4 Technician and practical engineering tracks (13th and 14th grades)

According to Central Bureau of Statistics data (to be published in October 2010), 4 600 students studied in tracks in the 13th and 14th grades during 2009. This track, which is designated for technicians and practical engineers, and is supervised by the MoE, supplements the technological education of high school graduates and awards them a degree that enables them to integrated into both the military and industry, as either academic reservists or as military cadets in their chosen profession. It also enables them to complete their academic studies towards a Bachelor's degree at a later date; the practical engineering programmes award them up to 40 credit points (out of the 120 points required for a Bachelor's degree or the 160 required for a B.Tech degree).

Technician and practical engineering students have different statuses based on criteria applied by the IDF. Reservists who choose to study prior to their army service and pay for their own studies are recognised by the IDF as technological reservists until they have completed their studies. Additional reservists are selected by the military to study and work in their chosen profession during their military service, and 80% of their tuition costs are funded by the military. Cadet reservists study in uniform from the 9th–14th grades, in colleges that have received authorisation from the military to operate as general cadet institutions, or in accordance with an IDF approval to open internal cadet classes. Both the ORT and AMAL technological schools operate these types of classes across the country. Students who attend such classes will go on to serve in the IDF's technical branches, the Air Force and the Ordnance Corps. Cadets are guided by instructors and soldier-teachers from the IDF's technical branch, who provide support for the students and their educational and technical progress until they complete their studies.

The parallel system that is supervised by the MoITL provides secondary education classes as supplemental high school education. This track enables students to receive a high vocational rating within the framework of these studies, and to complete some of their matriculation examinations, up to a total of 14 study units.

A5 Breakdown of apprenticeship subjects and vocations authorised by the MoITE

A5.1 Apprenticeship subjects

In accordance with the Apprenticeship Law (1953), the Minister of Industry, Trade and Labor determines that certain professions will be acquired through apprenticeship – a combination of study and work. The students study for three days a week and work for two or three days a week. The study programme in this track includes general studies as well as academic and practical studies. An apprentice who fulfils all the educational requirements and passes all the regular apprenticeship examinations or the apprenticeship subject of an industrial track is awarded a practical diploma. (A diploma is recognised as an official education-level document according to an agreement with the MoE.)

The following apprenticeship subjects are offered:

Field	Track
Accommodation	Cooking, confectionery
Electricity'	Electricity for home/industrial appliances
Metalwork	Structural metalwork
Automobile	Automobile mechanics, motorcycle mechanics
Various	Dental technician, ornamental gardening

A5.2 Classified vocations

These are vocations that are not subject to formal agreement or licensing. In accordance with the Employment Service Law (1959) (and in accordance with Employment Service regulations – Vocational Certificate – 1961), the Minister of Industry, Trade and Labor will determine the examination programmes for these vocations following consultation with an employer representative and an employee representative in this vocation. The conditions for obtaining a vocational certificate, without the requirement to pass additional examinations, are also decided within the framework of this consultancy. Those who successfully complete this track are entitled to receive a diploma and a vocational certificate from among the classified vocations that are currently active (see Appendix 2 for details), including computer programming, hair styling, bookkeeping, medical secretarial work, childcare work, electronics (computerisation and control) and cooking.

A5.3 Approved vocations

The training for these vocations is the basic first step. In the past this training was a part of the declaration process for a classified vocation, according to an arrangement between the Employment Service and the MoITL's Department for Vocational Training. Nowadays it is a standalone training process. Those who successfully complete this track are entitled to receive a diploma and a vocational certificate (exchangeable if it relates to a classified vocation) or a vocational approval. The list of approved vocations is a long one.

A6 Professional training for adults

The aim of such training is to give professional and non-professional adults (18+) the opportunity to change or upgrade their occupation with a view to improving their employment and earning potential.

Adult training in the MoITL's Senior Division for the Training and Development of Human Resources includes five tracks:

- professional retraining for academics;
- adult training (a day programme for job-seekers, business-oriented workshops and evening classes that are open to job-seekers and the general public);
- industry and building trade training;
- training to assist the advancement of women and the development of work aptitudes;
- implementation of the law on discharged service personnel.

The Institute for Training in Technology and Science (ITTS) is responsible for training certified technicians and practical engineers in technological-engineering professions. The ITTS confers on its graduates the qualified technician and practical engineer diplomas, as applicable, within the framework of the MoITL Department of Personnel Training and Development, and in conjunction with the MoE and the Federation of Technicians and Engineers.

The training is delivered through a network of authorised technological colleges and engineering and technician schools that operate across the country. There are currently 75 colleges and branches in operation under ITTS supervision, with 21 000 students (post-military service) studying for a qualified technician or practical engineer diploma. These colleges operate in accordance with defined and documented guidelines and in full cooperation with the ITTS. Their activities are funded by a dedicated government budget that is intended to cover a major part of the students' tuition fees and to ensure the continued development of the colleges and branches.

A7 Key indicators

* Key data: main statistics or estimations (budget allocation, students, teachers, public/private sectors) and main trends in relationships with the sub-systems and routes identified above.

***** Key elements of VET reform (curricula reform, occupational/certification standards, qualification frameworks, etc)

Indicators that will be collected through the ETF Key Indicators project and can be used by the Torino process

NB For the Torino process, the ETF will gather information on the following indicators from international sources – if international sources cannot provide data, national sources will be contacted:

- GDP by economic sector (World Bank);
- employment rates of older workers (55–64) by gender;
- enrolment rates in early childhood education (4+ years of age) by gender;
- graduates in mathematics, science and technology as a proportion of total graduates (UIS);
- private education as a percentage of the total, by educational level and by type (VET/general) (UIS);

- dependency rates (UN population division);
- population aged 0–14 as a percentage of the working-age population;
- population aged 64+ as a percentage of the working-age population;
- achievements of 15-year-olds in reading (PISA, for countries covered).

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Dr Roni Bernstein, Head of Youth and Apprenticeship, Ministry of Industry, Trade and Labor.

Shimon Cohen, CPA, Managing Director of the AMAL technological education network.

Dr Eli Eisenberg, Senior Deputy Director General and Head of the Administration for R&D and Training, ORT Israel.

Hagit Rimoch, in charge of industrial schools, AMAL network.

Dr Ze'ev Shapira, Director of the Department for Pedagogical Feedback and Colleges, AMAL network.

Ron Bar Yosef, Division for Vocational Training, Ministry of Industry, Trade and Labor.

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Appendix 1 – Tracks in the MoE's technological stream

The grouping of tracks in the MoE's technological stream, according to the recommendation of the Kenneth Preiss Report dated 2004, are as follows:

- **Scientific engineering cluster:** electronics and computer engineering, mechanical engineering, software engineering, biotechnology and scientific-engineering.

- **Technological cluster**: computerised production systems, construction and architectural engineering, industry and administration, industrial design, communication technologies, media and publishing, maritime systems, control systems and energy.
- **Occupational cluster**: business administration, nursing, childcare, hotel management, tourism and recreation.

In 2004 a sub-committee of the Senior Steering Committee for Science and Technological Studies was appointed to examine technological tracks and vocations; it was led by Professor Kenneth Preiss, and referred to as the Preiss Committee. The report concluding the work of this sub-committee was submitted in December 2004, and its main points are presented below.

The report's introduction stated that 'studies in a technological track shall not detract from or be at the expense of the study of basic subjects and skills that are required by every citizen in the 21st century, such as reading comprehension, logical thought, values, and so on. The Committee did not state what these subjects are, but it is aware of their importance'. The report further indicated that the various technological tracks should provide 'a challenging and experiential academic environment'.

Within the framework of the various tracks and vocational examinations process, the Preiss Committee categorised the tracks into three clusters.

The **scientific engineering** tracks: This cluster constitutes a 'foundation for the continuation of studies at universities and technical colleges'. Students in these tracks study 'basic science' (physics, chemistry, biology) as an introductory subject, in a similar way to students specialising in the theoretical sciences stream.

The **technological** tracks: This cluster constitutes a 'foundation for promoting studies and a future occupation based on advanced technology that contributes to the student, his or her family and the national economy'. It was indicated that the curriculum for this cluster would be based on the assumption that the nature of the knowledge and professional skills would necessarily change over time, and that continued studies of 'technological science' subjects would form an obligatory introduction to this track.

The **occupational** tracks: This cluster constitutes a 'foundation for developing an occupational career during the course of the student's life, and affords the student and his or her family social and economic mobility'. It was indicated that students in these tracks would be required to study an introductory subject (similar to the technological tracks), though it was not explicitly stated what this subject would be. It was further stated that studies in this track 'would combine a substantial element of practical experience that is both relevant and up to date, to advance students towards a productive occupation that contributes to him, his family and the national economy'.

Before detailing its recommendations regarding each of the tracks in technological education, the Preiss Committee felt it correct to explain why it supports the continued existence of technological education and all its various tracks (after setting out the changes it recommends).

The main reasons for this, as cited in the committee's report, were as follows.

- Technological and engineering professions that also require knowledge and skill in operating tools and technological systems are a vital element in any modern country's economy (including in hi-tech industries). According to the committee's report, the recommended and proven educational approach is that those who intend to become technicians should gain an understanding of, and practice using, tools and technological systems during their teenage years rather than during their twenties. This need becomes urgent as a result of the IDF's vital requirement for technical professionals.
- It is important that students perceive technological subjects as being relevant, innovative and primarily useful as a means of studying the sciences more deeply.
- According to the committee's report, the widespread trend towards every student being entitled to receive a matriculation certificate is not a reason to 'rule out the possibility of acquiring a

vocational foundation in youth that will assist the student in developing an occupational career throughout his life'. Thus, in developed countries such as Germany, England and the Netherlands, not every student studies for the matriculation examinations, and instead there is an affiliated vocational education system.

- Withdrawing technological education will require an increase in government expenditure because the cost of professional training at a later age will be greater than the savings made in withdrawing technological subjects in high school.

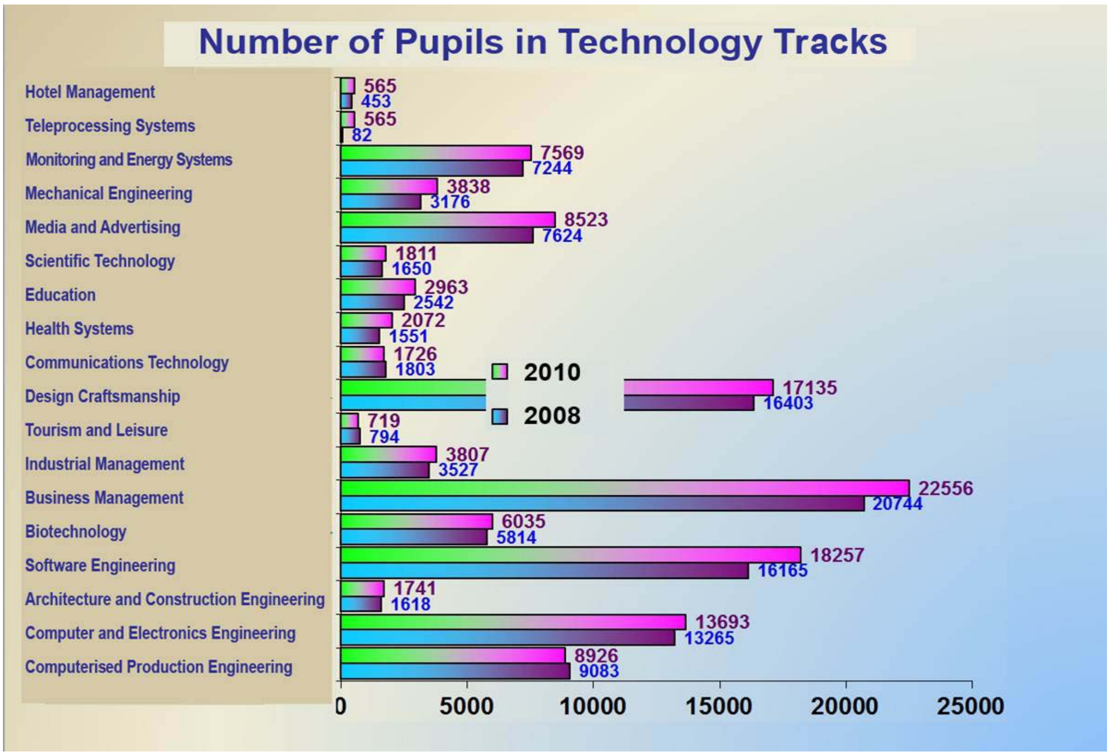
Furthermore, removing technological education (and postponing it until after military service) will place a greater strain on the families of the students affected because these students will no longer be able to help to support their families by working in their chosen profession.

In summarising its recommendations, the Preiss Committee indicated that the technological track should have three subjects of study:

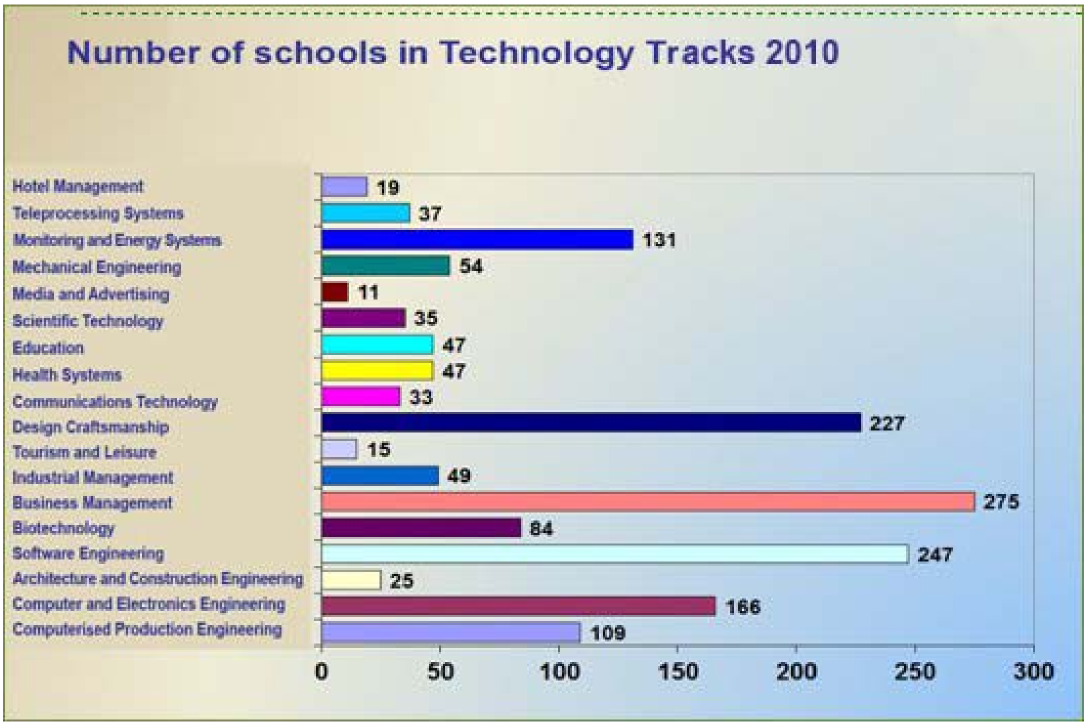
- Subject A – Basic scientific subject or 'technological science' subject;
- Subject B – The track's primary subject;
- Subject C – A subject for specialisation, within the framework of which the final project would usually be completed.

Source: Knesset Research and Information Centre, 2008, p. 23.

Distribution of students in various tracks of the technological stream, 2010



Distribution of schools in various tracks of the technological stream, 2010



Source: Ministry of Education data for 2010, the Science and Technology Administration

Appendix 2 – Training and studies, MoITL

Details of training and studies by the Ministry of Industry, Trade and Labor.

Source: The Central Bureau for Statistics, 2009 tables

תלמידים בבתי ספר לחניכים בפיקוח משרד התעשייה, המסחר והתעסוקה(1), לפי ענף הכשרה ומין

STUDENTS IN SCHOOLS FOR APPRENTICES UNDER THE SUPERVISION OF THE MINISTRY OF INDUSTRY, TRADE AND LABOR(1), BY FIELD OF TRAINING AND SEX

תשס"ח; 2007/08

Field of training	Arab education חינוך ערבי			Hebrew education חינוך עברי				ענף הכשרה
	בנות Girls	בנים Boys	סך הכל Total	בנות Girls	בנים Boys	סך הכל Total	סך הכל Total	
	ABSOLUTE NUMBERS						**מספרים מוחלטים**	
TOTAL	**417**	**3,808**	**4,225**	**1,998**	**7,262**	**9,260**	**13,485**	**סך הכל**
Building	-	13	13	-	32	32	45	בניין
Printing, photography and production	-	-	-	95	154	249	249	דפוס, צילום והפקה
Hotel keeping	-	-	-	84	410	494	494	הארחה
Electricity and electronics	-	580	580	98	1,186	1,284	1,864	חשמל ואלקטרוניקה
Dental technicians	-	-	-	73	152	225	225	טכנאות שיניים
Computers	19	166	185	105	413	518	703	מחשבים
Nursemaids	84	-	84	18	-	18	102	מטפלות
Administration	106	82	188	848	476	1,324	1,512	מינהל
Metal working	-	179	179	27	1,110	1,137	1,316	מתכת
Hairdressing and beauty care	180	210	390	427	264	691	1,081	ספרות וטיפוח החן
Woodwork and furniture	-	175	175	-	29	29	204	עץ ורהיטים
Automotive	3	1,969	1,972	14	2,041	2,055	4,027	רכב
Fashion and textile	-	-	-	23	6	29	29	אפנה וטקסטיל
Miscellaneous	24	435	459	183	992	1,175	1,634	שונות
	PERCENTAGES						**אחוזים**	
TOTAL	**9.9**	**90.1**	**100.0**	**21.6**	**78.4**	**100.0**		**סך הכל**
Building	-	100.0	100.0	-	100.0	100.0		בניין
Printing, photography and production	-	-	-	38.2	61.8	100.0		דפוס, צילום והפקה
Hotel keeping	-	-	-	17.0	83.0	100.0		הארחה
Electricity and electronics	-	100.0	100.0	7.6	92.4	100.0		חשמל ואלקטרוניקה
Dental technicians	-	-	-	32.4	67.6	100.0		טכנאות שיניים
Computers	10.3	89.7	100.0	20.3	79.7	100.0		מחשבים
Nursemaids	100.0	-	100.0	100.0	-	100.0		מטפלות
Administration	56.4	43.6	100.0	64.0	36.0	100.0		מינהל
Metal workers	-	100.0	100.0	2.4	97.6	100.0		מתכת
Hairdressing and beauty care	46.2	53.8	100.0	61.8	38.2	100.0		ספרות וטיפוח החן
Woodwork and furniture	-	100.0	100.0	-	100.0	100.0		עץ ורהיטים
Automotive	0.2	99.8	100.0	0.7	99.3	100.0		רכב
Fashion and textile	-	-	-	79.3	20.7	100.0		אפנה וטקסטיל
Miscellaneous	5.2	94.8	100.0	15.6	84.4	100.0		שונות

Appendix 3 – Rate of continuation to post-secondary studies

Rate of students completing 12th grade and continuing on to academic studies within eight years of graduation. Source: The Central Bureau for Statistics, 2009 tables

8.43

המשך לימודים גבוהים של מסיימי תיכון בתוך שמונה שנים מסיום לימודיהם התיכוניים, לפי תכונות נבחרות

CONTINUATION TO HIGHER EDUCATION AMONG UPPER SECONDARY SCHOOL GRADUATES WITHIN EIGHT YEARS AFTER COMPLETING SCHOOL, BY SELECTED CHARACTERISTICS

	לא המשיכו לימודים Did not continue studies	מכללה אקדמית לחינוך college of education	מכללה אקדמית Academic college	האוניברסיטה הפתוחה The Open University	אוניברסיטה University	סך הכל Total	סך כולל Grand total: אחוזים Percentages		סך כולל Grand total: מספרים מוחלטים Absolute numbers	
TOTAL										**סך הכל**
1990/91	61.5	2.7	6.0	8.5	21.3	38.5	100.0		64,168	תשנ"א
1992/93	59.0	3.1	8.5	8.4	21.0	41.0	100.0		73,621	תשנ"ג
1994/95	57.6	3.5	10.6	7.6	20.8	42.4	100.0		77,672	תשנ"ה
1996/97	57.7	3.2	11.6	7.4	20.2	42.3	100.0		82,203	תשנ"ז
1998/99	57.1	3.5	12.4	7.1	19.9	42.9	100.0		88,758	תשנ"ט
1999/00 - TOTAL	**57.8**	**3.4**	**13.2**	**6.8**	**18.7**	**42.2**	**100.0**	**100.0**	**89,875**	**תש"ס - סך הכל**
SEX										**מין**
Men	63.8	1.1	13.6	6.2	15.3	36.2	100.0	48.3	43,421	גברים
Women	52.1	5.6	12.9	7.5	21.9	47.9	100.0	51.7	46,454	נשים
MATRICULATION CERTIFICATES										**תעודת בגרות**
Entitled	34.3	5.6	20.9	8.6	30.6	65.7	100.0	60.2	54,104	זכאים
Not entitled	93.2	0.2	1.6	4.1	0.8	6.8	100.0	39.8	35,771	לא זכאים
HEBREW EDUCATION										**חינוך עברי**
TOTAL	**54.7**	**2.7**	**14.9**	**7.8**	**20.0**	**45.3**	**100.0**	**100.0**	**76,065**	**סך הכל**
SEX										**מין**
Men	60.9	1.0	15.0	7.0	16.2	39.1	100.0	48.6	36,995	גברים
Women	48.8	4.4	14.8	8.5	23.5	51.2	100.0	51.4	39,070	נשים
MATRICULATION CERTIFICATES										**תעודת בגרות**
Entitled	31.6	4.3	22.9	9.5	31.7	68.4	100.0	61.8	46,990	זכאים
Not entitled	92.0	0.2	1.9	4.9	0.9	8.0	100.0	38.2	29,075	לא זכאים
TRACK										**נתיב**
Thereof:										מזה:
General	43.5	3.8	17.6	8.6	26.6	56.5	100.0	67.4	47,032	עיוני
Vocational	66.9	1.3	12.7	7.8	11.2	33.1	100.0	32.6	22,715	טכנולוגי
SOCIO-ECONOMIC CLUSTER OF LOCALITY OF RESIDENCE										**אשכול חברתי - כלכלי של יישוב מגורים**
ARAB EDUCATION										**חינוך ערבי**
TOTAL	**74.8**	**7.4**	**4.0**	**1.7**	**12.0**	**25.2**	**100.0**	**100.0**	**13,810**	**סך הכל**
SEX										**מין**
Men	80.9	1.8	5.6	1.2	10.5	19.1	100.0	46.5	6,426	גברים
Women	69.5	12.3	2.5	2.2	13.4	30.5	100.0	53.5	7,384	נשים
MATRICULATION CERTIFICATES										**תעודת בגרות**
Entitled	52.4	14.2	7.5	2.8	23.1	47.6	100.0	51.5	7,114	זכאים
Not entitled	98.6	0.2	0.2	0.7	0.3	1.4	100.0	48.5	6,696	לא זכאים
TRACK										**נתיב**
Thereof:										מזה:
General	71.4	8.8	4.4	1.9	13.6	28.6	100.0	73.2	9,826	עיוני
Vocational	82.5	4.0	3.1	1.4	9.0	17.5	100.0	26.8	3,598	טכנולוגי
SOCIO-ECONOMIC CLUSTER OF LOCALITY OF RESIDENCE										**אשכול חברתי - כלכלי של יישוב מגורים**
1-2	78.0	6.9	3.0	1.2	10.8	22.0	100.0	32.3	4,097	2-1
3-4	69.1	9.1	4.9	2.3	14.7	30.9	100.0	52.2	6,622	4-3
5-10	83.0	3.9	2.5	1.5	9.0	17.0	100.0	15.5	1,961	10-5

Appendix 4 – Eligibility for matriculation certificate

The percentage of students entitled to receive a matriculation certificate in 2009.
(Source: The Central Bureau for Statistics, 2009 tables)

CBS, STATISTICAL ABSTRACT OF ISRAEL 2009 — למ"ס, שנתון סטטיסטי לישראל 2009

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נבחנים בבחינות בגרות,
לפי זכאות לתעודה ותכונות נבחרות

EXAMINEES IN MATRICULATION EXAMS, BY ENTITLEMENT TO A CERTIFICATE AND SELECTED CHARACTERISTICS

	לא-זכאים Not entitled	זכאים Entitled	סך הכל Total	לא-זכאים Not entitled	זכאים Entitled	סך הכל(1)(2) Total(1)(2)	
	PERCENTAGES		אחוזים	מספרים מוחלטים ABSOLUTE NUMBERS			
GRAND TOTAL							**סך כולל**
1995	34.1	65.9	100.0	19,972	38,566	58,538	1995
2000	39.0	61.0	100.0	28,787	45,029	73,816	2000
2005	37.6	62.4	100.0	31,635	52,525	84,160	2005
2007	37.8	62.2	100.0	32,405	53,409	85,814	2007
2008	38.4	61.6	100.0	32,311	51,782	84,093	2008
	HEBREW EDUCATION					**חינוך עברי**	
1995	31.1	68.9	100.0	15,477	34,331	49,808	1995
2000	36.1	63.9	100.0	22,426	39,752	62,178	2000
2005	35.0	65.0	100.0	24,227	44,934	69,161	2005
2007	33.9	66.0	100.0	23,086	44,905	67,991	2007
2008 - TOTAL	**33.8**	**66.2**	**100.0**	**22,443**	**43,849**	**66,292**	**2008 - סך הכל**
DISTRICT(3)							**מחוז(3)**
Jerusalem	35.9	64.1	100.0	2,132	3,814	5,946	ירושלים
Northern	39.6	60.4	100.0	3,126	4,761	7,887	הצפון
Haifa	35.7	64.3	100.0	2,914	5,239	8,153	חיפה
Central	32.5	67.5	100.0	6,440	13,380	19,820	המרכז
Tel Aviv	30.1	69.9	100.0	3,432	7,983	11,415	תל אביב
Southern	34.3	65.7	100.0	3,674	7,045	10,719	הדרום
Judea and Samaria Area(4)	30.8	69.2	100.0	725	1,627	2,352	אזור יהודה והשומרון(4)
SUPERVISION							**פיקוח**
General	32.7	67.3	100.0	16,425	33,869	50,294	כללי
Administration of Religious Education	32.9	67.1	100.0	4,352	8,855	13,207	מינהל חינוך דתי
Ultra-Orthodox	59.7	40.3	100.0	1,666	1,125	2,791	חרדי
EXAMINATION PROFILE							**הרכב בחינות**
Academic emphasis	30.1	69.9	100.0	13,371	31,071	44,442	דגש על מקצועות עיוניים
Technological emphasis	41.5	58.5	100.0	9,072	12,778	21,850	דגש על מקצועות טכנולוגיים
SEX							**מין**
Boys	39.2	60.8	100.0	12,405	19,272	31,677	בנים
Girls	29.0	71.0	100.0	9,986	24,450	34,436	בנות
MOTHER'S YEARS OF SCHOOLING							**שנות לימוד של האם**
1-8	50.3	49.7	100.0	959	947	1,906	8-1
9-12	39.4	60.6	100.0	11,863	18,258	30,121	12-9
13-15	25.3	74.7	100.0	3,160	9,323	12,483	15-13
16+	16.2	83.8	100.0	2,203	11,353	13,556	+16
	ARAB EDUCATION					**חינוך ערבי**	
1995	51.5	48.5	100.0	4,495	4,235	8,730	1995
2000	54.7	45.3	100.0	6,361	5,277	11,638	2000
2003	43.1	56.9	100.0	5,564	7,333	12,897	2003
2005	49.4	50.6	100.0	7,408	7,591	14,999	2005
2007	52.3	47.7	100.0	9,319	8,504	17,823	2007
2008 - TOTAL	**55.4**	**44.6**	**100.0**	**9,868**	**7,933**	**17,801**	**2008 - סך הכל**
EXAMINATION PROFILE							**הרכב בחינות**
Academic emphasis	54.4	45.6	100.0	5,528	4,641	10,169	דגש על מקצועות עיוניים
Technological emphasis	56.9	43.1	100.0	4,340	3,292	7,632	דגש על מקצועות טכנולוגיים
SEX							**מין**
Boys	63.5	36.5	100.0	4,923	2,835	7,758	בנים
Girls	49.2	50.8	100.0	4,944	5,097	10,041	בנות
MOTHER'S YEARS OF SCHOOLING							**שנות לימוד של האם**
1-8	61.2	38.8	100.0	2,929	1,859	4,788	8-1
9-12	52.0	48.0	100.0	3,799	3,509	7,308	12-9
13-15	26.1	73.9	100.0	221	627	848	15-13
16+	17.8	82.2	100.0	91	420	511	+16
RELIGION							**דת**
Moslems	57.9	42.1	100.0	8,167	5,932	14,099	מוסלמים
Christians	40.3	59.7	100.0	706	1,047	1,753	נוצרים
Druze	51.0	49.0	100.0	977	937	1,914	דרוזים

Appendix 5 – Directions in technological education in the state religious schools

New directions for boys in technological education in state religious schools.

Trend/Track	Existing	Five-Year Forecast
Biotechnology	422	528
Business Management – Accountancy	438	548
Computerised Production Systems	1 095	1 369
Computers and Electronic Engineering	1 377	1 721
Arts Design	360	450
Electronic Communications	354	443
Gourmet Cooking	33	41
Industrial Management	81	101
Mechanical Engineering	103	129
Media and Advertising	91	114
Medical Systems	250	313
Monitoring and Energy Systems	840	1,050
Preschool Education	65	81
Software Engineering	1 908	2 385
Technological Science	267	334
Teleprocessing	107	134
Total	7 791	9 741

Source: Science and Technology Administration, the Ministry of Education Programme for Promoting Technological Education in the State Religious Sector, 2010.

New directions for girls in technological education in state religious schools.

Trend/Track	Existing	Five-year Forecast
Architecture and Construction Engineering	141	183
Biotechnology	510	663
Business Management – Accountancy	1 756	2 283
Computerised Production Systems	36	47
Computers and Electronic Engineering	94	122
Arts Design	3 121	4 057
Electronic Communications	650	845
Gourmet Cooking	27	35
Industrial Management	71	92
Medical Systems	146	190
Monitoring and Energy Systems	53	69
Preschool Education	101	131
Software Engineering	500	650
Technological Science	132	172
Teleprocessing	26	34
Tourism Management	19	25
Total	7 383	9 598

Source: Science and Technology Administration, the Ministry of Education Programme for Promoting Technological Education in the State Religious Sector, 2010.

Appendix 6 – The ORT, AMAL and AMIT technological networks

ORT Israel

The ORT Israel network was founded in 1949 as an apolitical non-profit organisation. ORT Israel is the largest educational network in the country; its aim it to instil values in its students and nurture a broad education while focusing on technology and the sciences. The network's institutions include six-year secondary schools, industrial schools, educational centres and colleges for practical engineers and engineering with an academic outlook for both young people and adults. The core values of the ORT Israel network are: excellence and innovation, reliability, fairness and professionalism.

The network operates 184 institutions in which around 93 000 students study; these are located in more than 70 towns along the length and breadth of Israel, from Shlomi in the north down to Beer Chayil (Bir Al Haj), a Bedouin settlement on the border with Egypt. Furthermore, the network provides educational projects in a further 100 schools. The network's broad distribution also includes schools for all sectors of the population: secular, religious, Arab, Druze and Bedouin. On the basis of a belief in the importance of the principle of education for all, the network gives priority to admitting schools and developing them in locations that are at a distance from the centre of the country.

Since it must deal with various populations of students, the network has developed a number of different models for schools. The ORT Israel technological colleges are distributed across 30 sites around Israel and train around 30% of the country's technicians and practical engineers. Technological college graduates are employed by the technological units of the IDF and by the best corporations in the economy, in both the private and public sectors.

AMAL educational network

Founded in 1928, the AMAL network provides an educational-academic framework with an emphasis on technology, the sciences and the arts for all strata of the population from high-achieving young people from Israel's elite to young people who are at risk.

AMAL maintains that an education system must provide suitable and equitable opportunities for all sectors of Israeli society: Jews, Arabs, Druze, Bedouin and Christians, the secular, religious and ultra-orthodox. The AMAL network educates its students in humanitarian values, national values and scientific-technological excellence. The network has emphasised programmes that encourage innovation and initiative, providing advanced tuition that integrates ICT, conferring life skills, and nurturing the student as a thinking and creative human being. Furthermore, the network undertakes a wide range of activities associated with multi-culturalism and accepting people from all walks of life and all backgrounds.

In 2010 the AMAL group has 128 educational institutions spread across the country, from Safed and Nahariya in the north to Dimona in the south. These included high schools, junior high schools and colleges in Jewish, Arab (Muslim and Christian), Bedouin and Druze sectors, with a total enrolment of close to 40 000 students. Since 2009 ultra-orthodox students have also joined the network. The AMAL network provides professional training for the ultra-orthodox population by offering a two-year course for students from the 11th and 12th grades, primarily targeting young people at risk (around 700 boys and girls).

AMAL has 41 multi-disciplinary comprehensive high schools under the supervision of the MoE; these provide academic and scientific-technological education for all sectors. Students select the professional tracks on which they wish to concentrate, out of the 18 tracks in the technological stream.

On completing their studies, including a matriculation certificate, AMAL students can pursue academic studies or studies in a technician or practical engineering programme, or can enter their chosen profession in the army and the workplace. AMAL has 14 colleges for technicians and practical engineers, which are linked to the multi-disciplinary schools. Furthermore, AMAL operates 8 technological education centres, which are also under MoE supervision, in which students with lower achievement levels can undertake vocational training and study basic or core theoretical subjects.

In addition, AMAL has 22 technological schools spread across the country. This is the largest network that covers schools combining study and work. Around 4 200 students study at AMAL's technological schools (out of about 13 500 students within the remit of Israel's MoITL). Furthermore, the network has 16 colleges for adult students within the scope of the AMAL Achievements adult education programmes.

AMIT national religious network

Established in 1933, the AMIT network is operated by the AMIT organisation in Israel and the United States. Approximately 20 000 students are enrolled in around 90 schools across Israel. AMIT focuses on providing religious and scientific education. Its schools are well equipped with laboratories and advanced technological resources, in collaboration with the academic institution into which its students are integrated in the course of their studies. AMIT educates its students in the spirit of religious Zionism, emphasising integration with the democratic Jewish state.

The AMIT network includes primary and secondary schools, boarding schools and youth villages, yeshivas (religious seminaries for boys) and ulpanas (religious seminaries for girls), pre-IDF preparatory courses, and special religious seminary programmes for soldiers. The student population is extremely diverse, including students from development towns alongside students from well-established communities. AMIT was a pioneer in the establishment of boarding schools in Israel, establishing its first boarding school in 1933.

AMIT now operates five youth villages and family centres. The youth villages combine academic/theoretical studies with the study of agriculture or technology, based on students' preferences.

The rate of AMIT graduates eligible for the matriculation certificate is higher than the national average. AMIT graduates are integrated into all areas of industry in Israel.

Appendix 9 – Apprenticeship vocations

This appendix provides details of the apprenticeship vocations: classified vocations and those professions that are approved by the MoITE.

Apprenticeship vocations

According to the Apprenticeship Law (1953), the Minister of Industry, Trade and Labor declares by way of an order that an occupation (vocation) of a particular kind shall be acquired by way of apprenticeship – a combination of study and work where students study for three days a week and work for two or three days a week. The study syllabus in such courses includes general studies and vocational studies, both theoretical and practical. A student who passes all of the academic requirements and all of the examinations in an ordinary apprenticeship course or in an apprenticeship vocation in an industrial course is entitled to a completion certificate and a certificate of profession. Any student who does not meet all of the requirements but who has achieved good results in the practical sphere is entitled to a practical completion certificate. (A completion certificate serves as an official document recognising a level of education according to an agreement with the MoE.)

Apprenticeship vocations currently active:

Sector	Track
Hospitality	Cuisine, pastry chef
Electricity	Electrical work for home/industrial installations
Metals	Construction metalwork
Vehicle maintenance	Automobile mechanic; motorcycle mechanic
Other	Dental technician; garden designer

Classified professions

These are professions that are not dependent on any formal agreement or licensing. According to the Employment Service Law, 5719-1959 (and also to the Employment Service Regulations – Professional Certificates, 5721-1961), the Minister of Industry, Trade and Labor must set the examination programmes for these professions after consulting with the representatives of employers and workers in that profession. Within the scope of this consultation, conditions are also set for receiving a certification of profession for graduates, and for young people for whom there are no requirement for additional examinations. Those who successfully complete this course are entitled to a completion certificate and a certification of profession. The classified professions that currently exist (within the scope of the training sectors referred to above) are: computer programming, hair design, bookkeeping, medical secretarial work, caregiving, electronics, computerisation and control, and gourmet cooking/cuisine.

Approved professions

Training in these professions represents the basic and initial stage of acquiring a profession. In the past, this training was part of the process of declaring ‘a classified vocation’, according to the arrangement between the employment services and the Department for Professional Training at the MoITL. Today, in practice, it is a self-contained training process. Those who successfully complete such a course are entitled to both a completion certificate and a certificate of profession (if there is any similarity with a ‘classified vocation’) or to a professional permit/authorisation. There is a long list of these types of profession.

Appendix 10 – Teachers' combined salary tables, 2008

Source: The Ministry of Education:
http://cms.education.gov.il/EducationCMS/Units/Sherut/Sachar/AkademayiMusmachim.htm

Salary levels by teachers' Level of education/experience in ILS, per month				
Senior Instructor	**B.A./B.S.**	**M.A./M.S.**	**PhD.**	**Exp. (Yrs)**
2835.68	2967.54	3179.56	3365.62	1
2977.47	3115.92	3338.53	3533.90	2
3126.34	3271.72	3505.46	3710.59	3
3282.66	3435.30	3680.73	3896.12	4
3446.79	3607.07	3864.77	4090.93	5
3619.13	3787.42	4058.01	4295.48	6
3800.09	3976.79	4260.91	4510.25	7
3876.09	4056.33	4346.13	4600.45	8
3953.61	4137.46	4433.05	4692.46	9
4032.68	4220.21	4521.71	4786.31	10
4113.34	4304.61	4612.15	4882.04	11
4195.60	4390.70	4704.39	4979.68	12
4279.52	4478.52	4798.48	5079.27	13
4365.11	4568.09	4894.45	5180.86	14
4452.41	4659.45	4992.33	5284.48	15
4541.46	4752.64	5092.18	5390.17	16
4632.29	4847.69	5194.02	5497.97	17
4724.93	4944.64	5297.91	5607.93	18
4819.43	5043.54	5403.86	5720.09	19
4915.82	5144.41	5511.94	5834.49	20
5014.14	5247.30	5622.18	5951.18	21
5114.42	5352.24	5734.62	6070.20	22
5216.71	5459.29	5849.32	6191.61	23
5321.04	5568.47	5966.30	6315.44	24
5427.46	5679.84	6085.63	6441.75	25
5481.74	5736.64	6146.48	6506.17	26
5536.55	5794.01	6207.95	6571.23	27
5591.92	5851.95	6270.03	6636.94	28
5647.84	5910.47	6332.73	6703.31	29
5704.32	5969.57	6396.06	6770.34	30
5761.36	6029.27	6460.02	6838.04	31
5818.97	6089.56	6524.62	6906.43	32
5877.16	6150.45	6589.86	6975.49	33
5935.94	6211.96	6655.76	7045.24	34
5995.29	6274.08	6722.32	7115.70	35
6055.25	6336.82	6789.54	7186.85	36

Note: In secondary education in Israel, teachers are expected to work 24 hours for a full-time position, although most of them actually work around 32 hours in order to earn sufficient income. Moreover, they may receive part of their salary as compensation for jobs such as acting as subject coordinator, grade-level coordinator, matriculation preparation, professional counselling and workshops, in-service courses and extra tuition. The total of such compensation could be 8–25% of their salary.

Example: A teacher with an M.A. degree working in a 32-hour position will earn a monthly salary of ILS 5 300 in the first year, ILS 8 500 in the 15th year, and ILS 13 600 on retirement, after working for 36 years.

Glossary of abbreviations

CBS	The Central Bureau for Statistics
ETF	European Training Foundation
HR	Human Resources
IAESI	Israel Association of Electronics and Software Industries
IDF	Israel Defence Forces
IT	Information Technologies
ITTS	Government Institute for Training in Technology and Science
MAI	Manufacturers Association of Israel
MoE	Ministry of Education
MoITL	Ministry of Industry, Trade and Labor
MoS	Ministry of Science
NCRCD	National Council for Research and Civilian Development
R&D	Research & Development
SDVT	Senior Division for Vocational Training

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