Chapter 43

MATHEMATICS TEACHER EDUCATION IN ISRAELI COLLEGES OF EDUCATION:   
TRENDS AND CURRENT STATE

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In this chapter, we present a brief overview of changes that have taken place in the nature and status of Israeli education colleges over the past 50 years and the controversy these changes have introduced into the discussion of how to qualify mathematics teachers. We then present data regarding students’ attendance in the various programs for mathematics teacher training in colleges of education, and conclude by pointing out some current trends that may be the cause for the rising number of students who apply for mathematics teaching certificates in Israeli education colleges.

# Introduction

In Israel, in order to be a mathematics teacher, it is essential to hold a teaching certificate and a teaching license. A **teaching certificate** is an academic diploma awarded by an academic institution—a university or a college of education [CoE] (what is known as a teachers' college in other parts of the world). Currently, about 90% of Israeli teachers earn their teaching certificate at CoEs, with the remaining 10% at universities. Students at CoEs can choose to qualify either as early childhood educators or as elementary or secondary school teachers, while universities provide teaching certificates for secondary school teachers only. CoEs have three teacher training programs: a regular program, an academic retraining program, and an MTeach program. The course of studies for the students in the regular program is 4 years, for academic retraining—1–2 years (depending on their background), and for MTeach —2 years. In addition, some of the CoEs offer frameworks designed to support the professional development of in-service teachers, among them M.Ed. programs and various specialized courses. A **teaching license** is granted by the Department of Teacher Education at the Ministry of Education [MoE] subsequent to successful completion of a one-year internship. Mathematics teachers for secondary school may be entitled to one of two types of teaching licenses: A license for teaching 7th–10th grades, traditionally awarded to those who complete a Bachelor's degree in mathematics or mathematics-intensive disciplines; and a license for teaching 7th–12th grades, awarded to those with a Master's or Ph.D. degree in mathematics.

# Changes in the status of education colleges in Israel and their implications for mathematics teacher training programs

Since the 1970s, the issue of teacher training programs has been on the public agenda. Until the late 1970s, Israeli colleges of education were nonacademic colleges, with a three-year certification program. An “academization” process then began, and the teachers' colleges became academic colleges providing a 4-year teaching certificate program granting a Bachelor of Education degree (B.Ed.). In 2004, CoEs were accredited to grant a Masters of Education degree (M.Ed.), and in 2009, in order to attract graduates of universities to the teaching profession, the CoEs were also accredited to grant Master of Teaching degrees (MTeach). Five prominent commissions have left their mark on the process of academization: The Yaffe commission in 1971, the Etzioni commission in 1979, the Ben Peretz commission in 2001, the Dovrat commission in 2005 and the Ariav committee in 2006 (Hofman & Niederland, 2012).

The main goal of the **1971 commission** was to upgrade the colleges to 4-year academic CoEs granting a B.Ed. degree. Nonetheless, the commission maintained that academic training for teachers should be different from academic studies at universities; while the standards of studies in CoEs must be equivalent to those in the universities, the disciplinary studies must be supplemented with education toward social and national values in addition to the practical aspects of teaching. The **1979 commission** examined the status of teachers and the teaching profession, and declared that the teacher's role is critical to the future of Israel, and therefore working conditions of teachers must be improved. The commission mentioned academization as a way to improve the quality of new teachers as well as veteran ones, and had several meaningful recommendations, among them: selecting the candidates on the basis of more rigorous standards than those generally accepted; establishing clear criteria for faculty members in teacher training institutions; allowing teachers without academic degrees to attain a full academic education; and encouraging academic staff with a pedagogical orientation to become teacher educators. These recommendations had a significant influence on the academization of teacher training, including the Council for Higher Education’s [the CHE] new guidelines for academic training of teachers, a measure that laid the cornerstone for the current CoEs. During the second half of the 1990s, in order to meet the growing demand for higher education and to overcome relatively high admission requirements at universities, several new academic colleges (“regional colleges”) were established under the academic sponsorship of universities (most of them are autonomous colleges today). Some of these new academic colleges were required to open teacher training programs (Kfir & Ariav, 2008). However, the policy of the MoE stated that teacher training programs should only exist at designated colleges. Based on this, the **2001 commission** primarily addressed institutional and structural issues of the teacher education system and, similar to the 1979 commission, suggested raising the bar of admission for teacher training programs, and advised that a state licensing exam be implemented. While the admission level of the psychometric test was indeed raised, the suggestion of the licensing exam was not accepted. The report of the commission led the CHE to the conclusion that in order to raise the status of teaching, it is the Council that should be the body granting teaching certification and supervising the CoEs. Such a move would mean that the MoE would lose their control over the CoEs; due to the MoE’s objection this report had no practical consequences on the teacher training system.

The process of academization and the commissions’ recommendations sparked a debate over the relative weight of each component included in the mathematics teacher training program. In addition to the general courses and courses dealing with various aspects of education, mathematics teacher training programs for the regular program students in CoEs consist of three main components: disciplinary training (knowledge of general mathematics and mathematical knowledge related to teaching); didactic-pedagogical training (knowledge of mathematics school curriculum, textbooks, teaching methods and pedagogical approaches); and practical training (actual experience in teaching mathematics at school). Without a binding policy regarding the allocation of hours for each component and the nature and level of study of courses in each, such decisions are subject to the approaches of each CoE; as a result, mathematics teacher training programs designed in CoEs differ in scope, level and quality. In fact, this might be considered the Achilles heel of the CoE. In addition, the CoEs began to demand of its academic staff to complete doctoral studies, and new candidates are required to hold Ph.D. degrees in mathematics or mathematics education.

The **2005 commission** was appointed by the MoE and its task was to assess the entire Israeli education system, to recommend a general reform without exceeding the current budget, and to suggest guidelines for implementing the reform (Inbar, 2006). The commission declared that teaching, like any other job, should be measured according to inputs and outputs. The commission determined that a general reform of teacher training programs should be implemented, and that teachers must receive full academic training in their discipline (B.A./B.Sc.), as well as a teaching certificate which includes broad pedagogical training.

This training, according to the report, may take place at colleges that will be upgraded to academic colleges or at universities that will redesign their teacher training courses to better meet the needs of prospective teachers. The opponents to this recommendation maintained that those who intend to teach mathematics in elementary school do not have sufficient mathematical abilities to allow them to study towards a bachelor's degree in mathematics, which is why they have not chosen to teach mathematics in secondary school students in the first place. In any case, this controversy has exposed the fact that some consider the CoEs to be 'sub-academic' in contrast to the universities, and that the level of CoE students is low. We return to this point in Section 4. Furthermore, the recommendation was to close several CoEs so that the budget saved could be used toward reforming the entire education system. The Minister of Education at that time insisted on implementing the reform in its entirety, and her inflexible attitude resulted in a strong backlash, particularly from the teachers’ unions. Nonetheless, the CoEs paid an immediate price in the form of budget cuts. A year later, the **2006 Committee** that was appointed by the CHE published a Layouts for teacher training in institutions of higher education, which were identical for both CoEs and universities (Council of Higher Education, 2006). Unlike the 2005 commission, which viewed teachers as “school workers,” this committee used terms such as “professional teacher” or “teacher-educator,” and declared that teaching is an activity anchored in both theoretical research and practical-reflective knowledge. The unified guidelines for training teachers suggested reducing total studies for B.Ed. from 108 academic points to 90-96 points, of which 60 points would be disciplinary content. The committee also defined the common knowledge base that every teacher should hold, regardless of the discipline or educational level, and recommended the study of either two disciplines, or a single extended one (Dror, 2012). The implementation of the Layouts, which is currently under reevaluation, contributed to the enhancement of mathematical knowledge in new teachers.

# Mathematics teacher education in numbers

Currently, there are 22 CoEs in Israel. Among them, 19 are in the Jewish sector and three in the Arab sector. The Jewish CoEs include nine secular colleges and 10 religious ones. Half of the religious colleges are very small. However, these numbers are expected to decline over the coming years due to the above-mentioned directive to close or merge colleges.

Official documents of the MoE indicate that in the 2016-2017 academic year close to 50,000 students attend CoEs, among them about 4,000 specializing in mathematics. Table 1 describes the number of students in CoEs by track, sector and gender (F=Female). The “others” in the “Track” line refers to student whose track was not specified, while the “others” in the “Sector” section relates to Druze, Circassians, Armenians, et al. In total, there are 3061 females out of 3816 students (80.21%). However, in the tracks of academic retraining and MTeach for 7-12 grades, the percentage of females is about 63%. This reflects changes in the composition of the mathematics teaching force in Israeli secondary schools in recent years, as described in Figure 1.

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| Track  N=3816 | | B.Ed./BA  N=2161 | Academic retraining  N=929 | M.Ed.  N=402 | MTeach  N=175 | Others  N=149 |
| Grades  N=3816 | 1-6  N=1660  (43.5%) | 1129  F=88.22% | 362  F=94.75% | 115  F=89.21% |  | 54 |
| 7-12  N=2156  (56.5%) | 1032  F=77.13% | 567  F=63.14% | 287  F=77.82% | 175  F=63.43% | 95 |
| Sector  N=3816 | Jewish  N=2553  (66.9%) | 1368  F=80.87% | 725  F=73.93% | 225  F=81.78% | 154  F=61.03% | 81 |
| Arabs  N=1096  (28.72%) | 754  F=79.17% | 155  F=78.06% | 169  F=82.24% | 18  F=77.78% |  |
| Others  N=167  (4.38%) | 39  F=92.3% | 49  F=89.79% | 8  F=87.5% | 3  F=100% | 68 |

**Table 1: Distribution of mathematics students in CoEs,   
by track, grade, sector and gender (2016-17)**

An interesting trend over the past 10 years, indicated in Figure 1 below, is the massive increase in the number of students specializing in mathematics teaching at CoEs. This figure describes the number of students in their last year of studies, and includes four groups: Regular program (B.Ed./B.A.) students in their 4th year of studies (those who specialized in elementary/secondary school teaching indicated by Reg 1-6/Reg 7-12, respectively), and academic retraining students in their last year of studies (similarly indicated by AR 1-6/AR 7-12). During the years indicated, the number of Reg 1-6 students almost tripled (from 125 to 353), and the number of Reg 7-12 increased by about 67% (from 124-208). A significant increase occurred in the number of AR students: the number of AR 1-6 increased from 27 to 207 (760%) and the number of AR 7-12 increased from 69 to 397 (580%). Note that these findings indicate that the number of teachers starting teaching mathematics at the secondary school level today that graduated from the AR track is twice the number of those that graduated the regular track. In addition to challenges related to the nature of the qualification, this also has implications on the entire secondary school system; this issue, however, is beyond the scope of this chapter.

**Figure 1: Number of students in their last year of studies   
by track and grade, between 2007-08 and 2015-16**

# Recent trends

In 2015, the Wineburg Committee (Wineburg, 2015) for the evaluation of education and science education study programs appointed by the CHE indicated that many of the lecturers in the Faculty of Education in universities do not feel committed to the education system but are there chiefly for research, and that students do not receive sufficient practical experience in schools. This stands in stark contrast to the picture in most CoEs, where the emphasis in general is on an optimal balance between the practical, the disciplinary and the pedagogical-didactic, and the teaching staff is oriented first and foremost toward teacher training. Nonetheless, on January 2017, the superintendent of mathematics, under the auspices of the Education Ministry Director, issued a directive with regard to eligibility for the teaching license: regular program or academic retraining students holding B.A./B.Sc. degrees in mathematics or some specific engineering fields will be entitled to a teaching license for 7th-12th grades. Academic retraining students above a certain threshold level of previous studies in mathematics will be required to complete additional courses in mathematics, and will then be entitled to a teaching license for 7th-10th grades. Other candidates will be eligible to study toward a mathematics teaching certificate for 7th-10th grades only upon completion of their missing points in mathematics at a mathematics department at one of the universities. Prior to this directive, such candidates were allowed to complete their missing studies at CoEs. This new directive, no doubt, illustrates the goal of the MoE to improve the process of mathematics teacher training; however, in practice this may hold back the COEs rather than advance their academization process. In the meantime, it is difficult to anticipate the impact of this directive on the training of mathematics teachers in colleges of education.

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About the authors

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