

Implementation Process:
**Recommendations of the Committee for the Evaluation of the
Department of Education in Science and Technology**
(recommendations were submitted on March 2015, following the committee's visit on December 15, 2015)

June 2015

Introduction

The Department of Education in Science and Technology wishes to express its gratitude to the committee for its valuable feedback and useful suggestions, which will enable the Technion to continue to lead and further contribute to STEM education in Israel and worldwide.

In what follows, we describe the implementation process of all of the committee's recommendations.

Our plan is presented in three tables, according to:

- Table 1: Timeline
- Table 2: Essential recommendations by areas (as appeared in the report)
- Table 3: Advisable and Desirable recommendations by areas (as appeared in the report)

Table 1: Timeline (for details, see Tables 2&3)

Stage	Period	Description
1	May 2015 - June 2015	Essential <ul style="list-style-type: none"> ○ Transition the department status to that of a faculty.
2	by July 2015	Essential <ul style="list-style-type: none"> ○ Form two committees: <ul style="list-style-type: none"> ▪ Advisory board (our broader interpretation of the 'forum for collective faculty deliberations' suggested by the committee). ▪ Ad-hoc committee for the examination of top teacher education programs at research universities around the world.
3	August 2015 - February 2016	Essential <ul style="list-style-type: none"> ○ Summarize the organizational changes required to support the transition to faculty status. ○ Advisory board - develop a strategic plan. ○ Ad-hoc committee for the examination of top educational studies worldwide - devise a plan for upgrading the teacher education curriculum so as to align it with top programs worldwide.

		<ul style="list-style-type: none"> ○ Elaborate on the strategic plan specified under Missions and Goals with respect to hiring priorities, new areas of growth, and areas that should be expanded by building on existing strengths. <p>Advisable</p> <ul style="list-style-type: none"> ○ Examine and redesign the courses in Psychology and Philosophy of Education. ○ Establish a forum of faculty members and Views students to develop structured opportunities that will enable them to learn more about school leadership, pedagogical leadership, system change, and so on. ○ Develop mechanisms (e.g., new kinds of publications, websites, email blasts, podcasts) by which parents, practitioners, policymakers, and the general public can learn about and benefit from the research conducted in our department. ○ Increase efforts aimed at improving laboratory facilities and meeting other new infrastructure needs of the unit. <p>Desirable</p> <ul style="list-style-type: none"> ○ Establish a forum that will meet on a regular basis to help adjuncts align with the instructional “big picture” across courses.
4	March 2016 – on going: committees’ work	<p>Essential</p> <ul style="list-style-type: none"> ○ Advisory board ○ Views forum <p>Advisable</p> <ul style="list-style-type: none"> ○ Curriculum committee <p>Desirable</p> <ul style="list-style-type: none"> ○ Adjuncts forum
5	March 2016 – on going: development activities	<p>Advisable</p> <ul style="list-style-type: none"> ○ Update course curricula based on the recommendations of the committee that examines top teacher preparation programs worldwide (submitted in February 2016), including an examination of: <ul style="list-style-type: none"> ▪ Learning outcomes; ▪ Coherence and integration of the curriculum.

Table 2: Essential recommendations by areas (as appeared in the report)

Top level:

- Advisory board (# 1 & 2)
- Transition to faculty (# 3)
- The Views program (# 4)
- Examination of top teacher education programs at top research universities around the world (# 5)
- Strategic plan in accordance with *Missions and Goals* (# 6)

Committee Recommendation	Steps toward implementation
Legend: Immediately , 3 months , 1 year , done	
<u>Mission and Goals</u>	
<p>1. Within three months (July 31, 2015), the unit must establish a forum for collective faculty deliberations. A committee of 7-12 members must be nominated including representation from senior faculty, assistant professors, adjuncts and key alumni.</p>	<ul style="list-style-type: none"> • An advisory board is being assembled with representatives from among faculty members, adjuncts, key alumni, Technion management, other Technion faculties, STEM teachers, high school principals, educational networks (Ort, Amal, Kadima Mada, Amit), Ministry of Education, hi-tech industry, IDF, Samuel Neaman Institute, other universities, Haifa Municipality. • Invitations will be sent after the department transitions to faculty status. <p>Since the committee cannot include representatives from all these groups on a regular basis, some of them will be invited only to meetings on specific topics, as deemed relevant.</p>
<p>2. Within 12 months (February 2016) this committee must develop a strategic plan for how it will influence Israeli STEM education as a whole. [...] The document will guide decisions for adding new faculty and expanding into new areas. In composing this document, the committee is encouraged to draw on the institutional resources that exist at the Technion (for example, consulting experts from the Department of Organizational Planning).</p>	<p>This recommendation will be implemented after the committee is assembled.</p>

<u>Organizational Structure</u>	
3. Immediately transition the unit of Education in Science and Technology into becoming a freestanding faculty.	A Senate meeting is scheduled for June 28, 2015 , to complete, and hopefully confirm this transition.
Within 12 months (February 2016) , complete all organizational and budgetary issues needed to support this transition.	<p>Due to the significant increase in the number of students (X 3) and faculty members (X 1.5) over the past four years, the department's needs will be re-calculated taking into account:</p> <ul style="list-style-type: none"> • Teaching points (יחידות תעסוקה) • Administrative positions <ul style="list-style-type: none"> ○ Portion of current positions ○ A new part-time position: Industrial Affiliates Program (IAP) coordinator (in our case, we also include the education sector in this Alliance). • Infrastructure and space
<u>Study Programs</u>	
4. The Views program must be continued and further developed. The program must be adequately funded and supported.	<ul style="list-style-type: none"> • This recommendation will be implemented starting next academic year. • A Forum will be established with Views students and alumni, faculty members (Barak, Gero, Koichu, Hazzan-head), and adjuncts. • An association of Views alumni will be established to further their development as a quality and leading group of STEM teachers. • The implementation of this recommendation will include the implementation of the following Advisable recommendation: <ul style="list-style-type: none"> ○ For Views students, it is advisable to develop structured opportunities (courses, projects, etc.) that will enable them to learn more about school leadership, pedagogical leadership, system change, and so on. One possibility is to create a seminar for Views students who have leadership potential and introduce them to macro issues of

	<p>educational change at both regional and national level.</p>
<p>5. Within one year (February 2016), the unit must create a committee to examine top teacher education programs at research universities around the world (e.g., Michigan, Michigan State, Stanford, Berkeley, U. of Twente). This committee should review the existing teacher certification programs in light of the principles and practices that define leading programs elsewhere. Within the year, this committee must devise a plan for upgrading the teacher education curriculum in order to bring it into alignment with top programs worldwide.</p>	<ul style="list-style-type: none"> • A committee was established: <ul style="list-style-type: none"> ○ Co-chairs: Tal & Hazzan ○ Members: Kapon, Metzuyanin, Verner • Preliminary ideas for discussion: <ul style="list-style-type: none"> ○ Road map towards assuming a leadership role in Israel and worldwide; ○ Practicum: Consider entering the Ministry of Education pilot of Academia-Classroom, which includes on-site, in school, pre-service teacher preparation; ○ Curriculum design/development (in accordance with to the NGSS); ○ Course exchange / joint courses with other leading universities; ○ International students. • The committee will also examine the following Advisable and Desirable recommendations: <ul style="list-style-type: none"> ○ Advisable: Faculty should work to achieve a meaningful integration of theoretical and applied knowledge in all programs. Courses in the unit should include relevant examples and activities that pertain to the world of educational practice and the everyday realities of schooling. ○ Advisable: Course in Psychology and the Philosophy of Education need to be connected to subject-specific concepts and issues. ○ Advisable: Faculty should establish mechanism for regular discussion about the coherence and integration of the curriculum. ○ Advisable: In the process of examine the BA program, the faculty should examine and upgrade both learning outcomes (and their means of assessment) and course content. ○ Advisable: The unit needs to consider how best to meet the unique needs of different populations of students (new first-degree

	<p>students and older students from industry and high tech).</p> <ul style="list-style-type: none"> ○ Advisable: The unit should develop mechanisms (e.g., new kinds of publication, websites, email blasts, podcasts) by which parents, practitioners, policymakers, and the general public can learn about and benefit from the research conducted by its faculty – <ul style="list-style-type: none"> - Will be led by Baram-Tsabari, expert in science communication. Among other things, we will explore the establishment of a bi-weekly online department magazine. ○ Desirable: The faculty should create a forum that will meet on a regular basis to help adjuncts align with the instructional “big picture” across courses
<p><u>Human Resources / Faculty</u></p>	
<p>6. Within 12 months (February 2016), the strategic plan specified under <i>Missions and Goals</i> must address hiring priorities, define new areas of growth, and address those that should be expanded by building on existing strengths. A more systematic and wide-ranging approach is needed to locate and hire the most talented researchers in the teaching and learning of STEM subject.</p>	<ul style="list-style-type: none"> • To increase knowledge exchange, the actual structure of the group that will focus on this issue will be determined after the two other committees (the advisory boards and the ad-hoc committee for the examination of teacher preparation programs in top universities) begin their discussions.
<p><u>Students</u></p>	
<p>N/A</p>	
<p><u>Teaching and learning outcomes</u></p>	
<p>N/A</p>	
<p><u>Research</u></p>	
<p>N/A</p>	

Table 3: Advisable and Desirable recommendations by areas (as appeared in the report)

The following Advisable and Desirable recommendations each belong to one of the following categories:

- A. **Has already been implemented** (within the department or the Technion)
- B. Is included in **the Essential** recommendations (and, therefore, appears also in Table 2 above)
- C. Is **irrelevant** for implementation (for each case, we explain why).

Advisable	
<u>Organizational Structure</u>	
1. The Curriculum Committee should come together on a regular basis to discuss and promote the coherence of programs and the various courses within the unit.	<p>Status: A</p> <ul style="list-style-type: none"> • A new faculty role was added (as of the 2016 academic year): Vice Dean for Teaching and Learning, whose responsibilities include coordination of the committee meetings. The committee's members are the Dean, the said Vice Dean, the Undergraduate Studies Coordinator, and the Graduate Studies Coordinator. • The committee's role will include (among other things) the preparation of a strategic plan for its own scope and aims.
<u>Study Programs - BA</u>	
<p>(1 – Continues)</p> <p>Faculty should work to achieve a meaningful integration of theoretical and applied knowledge in all programs. Courses in the unit should include relevant examples and activities that pertain to the world of educational practice and the everyday realities of schooling.</p> <p>Course in Psychology and the Philosophy of Education need to be connected to subject-specific concepts and issues.</p>	<p>Status: B</p> <p>This will be implemented based on the recommendation of the committee that examines top teacher preparation programs worldwide.</p> <p>Status: B</p> <p>A faculty member (Metzuyanim) was assigned to head a sub-committee entrusted with the redesign of the Psychology and Philosophy of Education courses.</p>

<p>a) Faculty should establish mechanism for regular discussion about the coherence and integration of the curriculum.</p> <p>b) The unit needs to establish a system where students can take course at an appropriate level to prepare them for more advanced courses in the scientific disciplines.</p> <p>c) The unit needs to offer required courses in a more regular basis to allow students to complete their programs in a timely manner.</p> <p>d) The unit should offer statistics courses tailored to the needs of students engaged in educational research.</p>	<p>This sub-committee will be part of the aforementioned committee for the examination of teacher preparation programs in top universities.</p> <p>Status: B</p> <p>This will be included in the agenda of the ad-hoc committee for the examination of teacher preparation programs.</p> <p>Status: C</p> <p>Since (a) the majority of our students are Technion graduates (studying in the Views program) and (b) the Acceptance Qualifying Score (SECHEM in Hebrew) for regular students has been raised to 84 (like for the Physics Faculty and the Faculty of Industrial Engineering and Management), we anticipate that this problem will disappear in the very near future. Nevertheless, we will monitor this issue and if a problem arises, it will be solved on an individual basis.</p> <p>Status: C</p> <p>The implementation of this recommendation depends on the number of students in each specific track; nevertheless, many of the courses are now given at a higher frequency.</p> <p>Status: A</p> <p>A new course, designed specifically for the research needs of our students, has been offered in the Spring 2015 semester and will be offered every other year.</p>
<p><u>Study Programs – Teacher Certification</u></p>	
<p>2. The unit needs to consider how best to meet the unique needs of different populations of students (new first-degree students and older students from industry and high tech).</p>	<p>Status: B</p> <p>The various changes that have taken place over the past several years will be tracked, and their influences on different student characteristics and on the department's study programs will be examined.</p>

	This will be included in the agenda of the ad-hoc committee for the examination of teacher preparation programs.
3. For Views students, it is advisable to develop structured opportunities (courses, projects, etc.) that will enable them to learn more about school leadership, pedagogical leadership, system change, and so on. One possibility is to create a seminar for Views students who have leadership potential and introduce them to macro issues of educational change at both regional and national level.	<p>Status: B</p> <p>This will be implemented as part of the following Essential recommendation under Study Program:</p> <ul style="list-style-type: none"> The Views program must be continued and further developed. The program must be adequately funded and supported.
<u>Human Resources / Faculty</u>	
4. Criteria for promotion should be brought into alignment with the overarching goal of influencing the educational system nationwide. For example, credit should be given to Hebrew publications that reach practitioners, for leading initiatives that promote innovative teaching and learning, for researching professional development, and for participating in national educational committees.	<p>Status: C</p> <p>As faculty members of a leading university, we should first meet the Technion criteria for excellence in research, teaching and service (which includes contribution to the community in general and publications in Hebrew in Hebrew). Nevertheless, when appropriate, we will use this recommendation to reinforce individual faculty members' cases for promotion.</p>
<u>Students</u>	
5. Develop more robust support systems to address the needs of academically weaker students. These support systems should be on going rather than offered only in the summer, and should address academic as well as languages skills.	<p>Status: A</p> <p>Such a system is already provided by the Technion administration. We anticipate that this problem will vanish in the near future due to the new profile of our cohort of students mentioned above.</p>
6. Develop policies that ensure that women with emergent families are adequately served.	<p>Status: A</p> <p>We follow the Technion guidelines and provide what is commonly offered (and sometimes even more).</p>
7. Expand the preparatory programs for students from the Haredi sector and open such programs to both men and women.	<p>Status: A</p> <p>This activity is already offered by the Technion. We hope and believe that some of the potential students will choose to study in our department.</p>

<u>Teaching and learning outcomes</u>	
8. In the process of examine the BA program (See student program above: BA), the faculty should examine and upgrade both learning outcomes (and their means of assessment) and course content.	Status: B This will be done, as suggested, when the BA programs are examined.
<u>Research</u>	
9. The unit should develop mechanisms (e.g., new kinds of publication, websites, email blasts, podcasts) by which parents, practitioners, policymakers, and the general public can learn about and benefit from the research conducted by its faculty.	Status: B This will be on the agenda of the ad-hoc committee for the examination of teacher preparation programs at top universities and will be led by Baram-Tsabari, who is an expert in science communication.
10. The unit should develop mechanisms to motivate researchers to publish in Hebrew (See elaboration under “Human Resources”)	Status: C See our response under Human resources / Faculty.
11. The unit should develop mechanisms to encourage faculty to study the impact of their activities in the field, including such areas as teacher preparation and ongoing development across the lifespan; and the transition of scientists and engineers into becoming science educators.	Status: C This is an interesting suggestion that we believe is based on inadequate data. To the best of our knowledge, many of our research works focus explicitly on the impact of our activities in STEM education in Israel and worldwide.
<u>Infrastructure</u>	
12. Laboratory facilities are badly in need of innovation. As the strategic plan for the unit unfolds, new infrastructure needs of the unit in general, and lab facilities in particular, will become clear. The institution should work with the unit to meet these needs.	Status: B The laboratory facilities were submitted to the Technion management as projects for funding. This recommendation will be implemented pending the Technion’s priorities and the associations’ ability to raise sufficient funding.
Desirable	
1. The faculty should create a forum that will meet on a regular basis to help adjuncts align with the instructional “big picture” across courses.	Status: B We already hold semester meetings for all faculty members (tenured and adjuncts). This will be included in the agenda of the committee that examines top teacher preparation programs and will be given increased attention.