CLUSTER EVALUATION OF THE "TEACHING PLUS" PROGRAM FOR TEACHERS' CLINICAL TRAINING – INTERIM REPORT

Henrietta Szold Institute

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EXECUTIVE SUMMARY

A. Background

The Trump Foundation was established in 2011 to improve achievements in public education. Its activities focus on the promotion of excellence in mathematics and sciences in high school and emphasize improvement and development of teaching in these disciplines, employing a variety of strategies and also expanding the circle of learners.

In 2013, the Trump Foundation initiated a series of teacher training programs mathematics and sciences for high school according to a clinical training model. In the 2016 school year, these school-based training programs, designed to train teachers to teach five-unit level,[1] are operated in seven colleges and a university (one in the Tel Aviv University and others in the Beit Berl, Levinsky, Oranim, Achva, Al-Qasemi, Herzog and Kibbutzim academic colleges), as part of the project known as the "Teaching Plus" network.

The programs are implemented in different ways and in different environments, but they share the same goal and are all based on common principles:

1. **The level of the candidates**: candidates must have broad knowledge in the relevant field, high cognitive abilities, and motivation to work as teachers and must be found suitable for work in the profession.
2. **Practical training**, providing the trainees with practical preparation for teaching work and offering close guidance and study with experienced teachers (teacher-instructors).

[1] Study unit levels range from 1 to 5 units. They are calculated by the number of class hours devoted to the subject. In most subjects, students may choose the number of units in which they are tested. Level of difficulty is expressed as "units of study", from 1 (least difficult) to 5 (most difficult).

3. Focus on students' learning and acquiring tools to **diagnose** and promote their differential progress.
4. Support for the appointment of new teachers who complete the program and coaching in their first years as teachers.
5. Building collaboration between the teacher, the schools and the college, empowering participants and supporting the development of teacher-instructors.

B. The Research Rationale

The research examining the "Teaching Plus" programs in the field of mathematics employed cluster analysis, by eight different training clinical teacher-training programs that together form a network. The use of cluster evaluation allows us to learn about the range of programs and the overall accumulated change and also allows comparison between the different programs based on common principles, while paying attention to the different contexts in which they operate. The different training programs are analyzed using uniform research tools, in order to evaluate the network's common measures.

C. The Research Questions

The main questions examined by the research presented in this report were:

1. How and to what extent are common principles applied in the different training programs?
    a. What is the profile of students studying in these training programs?
    b. Does a practice-focused training course provide students with practical preparation for teaching work?
    c. Is there a focus on the students' learning and providing tools for differential diagnosis and progress?
    d. Is there support for the appointment of students and graduates and guidance in their first years of teaching?
    e. How is the training implemented by teachers in schools?

D. The Research Tools and the Research Population

Table 1: The research tools and research population

The research tool	No. of respondents
Questionnaire for the students	92
Questionnaire for the graduates	33
Interviews with Ministry of Education representatives	4
Interviews with the program managers	8
Interviews with the pedagogic instructors	8
Interviews with the teacher-instructors[2]	6
Interviews with students	7
Interviews with graduates who have completed the program	5
Data on the education and occupations of students accepted to the courses	6

E. Summary of Main Research Findings

1. *Clinical teaching as reflected in the views of program managers and Ministry of Education representatives*

Clinical teaching involves teaching that focuses on the students and their needs—a method which has become necessary due to the enlargement of the circle of students studying five units. Since the group of students studying five units has grown more heterogeneous it now includes students with varied needs; clinical teaching can provide a response to these needs. The managers noted two main aspects as unique training for clinical teaching: the connection between theory and practice and the fact that the students are trained using clinical teaching, allowing them to have personal experiences as students, and providing them with a personal example that they can then apply in their work with their own students.

[2] One teacher-instructor was interviewed from each course. In two of the courses the teacher-instructors also served as pedagogic instructors and they are therefore included in that category.

2. ***Profile of the students and the graduates***

One of the principles on which the "Teaching Plus" network is based is **candidate quality**: their knowledge in their specific field, and their motivation to work in teaching. These components were investigated while examining the profiles of the students and graduates who had been accepted to the programs. From the findings it appears that most of the students were motivated to work in teaching as well as educational and occupational backgrounds which provided them with knowledge in appropriate disciplines.

Prior education: the frequencies of the students' and graduates' bachelor's degrees were – in engineering (33% of students – N=30; 56% of graduates, N=18), in mathematics (24% of students, N=22; 19% of graduates, N=6). 21% (N=19) of the students had a bachelor's degree in computer sciences. With regard to advanced degrees, 61% of the students (N=23) and 68% of the graduates (N=15) held a Master's degree in management and business administration. Nevertheless, 10 students who responded to the questionnaire also reported that they had Bachelor's degrees in disciplines that are not rooted in mathematics, including education and teaching, social sciences, humanities and law.

Mathematical knowledge: Some of the teacher-instructors believed that it was necessary to reinforce the mathematical knowledge of some of the students. This issue was raised in interviews with representatives of the Ministry of Education and some of the interviewed representatives felt that it was important to include more theoretical mathematics courses as part of the training. By contrast, other interviewees noted the students' mathematical knowledge as positive and pointed out the students' independent learning abilities, allowing them to bridge any gaps in knowledge that may arise.

Occupational experience: Findings from the questionnaire indicated that most of the students and the graduates worked in the fields of engineering and hi-tech (52% of students, N=45; 66% of graduates, N=21). Among the students there were also some who had previous work experience in teaching (13%, N=11). It is noted that 12 of the students who responded to this question reported occupational experience in other areas including group instruction, sales, and work in a fashion company.

Motivation to teach: The teacher-instructors positively noted the uniqueness of the students in the "Teacher Plus" network, particularly in terms of their prior background and their motivation to teach. The students and the graduates themselves noted that their motivation to switch careers to teaching stemmed from their desire to contribute to society (72% of students, N=65; 64% of graduates, N=25) and also from their desire to

teach (45% of students, N=39; 34% of graduates, N=12). Some of the students had also received recommendations from their friends regarding the program (31%, N=27) and some had been approached by representatives of the program or received an offer from the IDF Veterans Association (34%, N=12 and 22%, N=7 respectively).

Most of the students and the graduates chose to study in a specific retraining program because they were impressed by it (56% of both groups, graduates: N=18, students: N=50). The graduates noted that participation in a "screening day" contributed to their estimation of the program (34%, N=12). Additional considerations for choosing the programs were proximity of program to their place of residence (32% of students – N=28; 28% of graduates – N=10) and being impressed by the faculty staff (26% of students, N=23; 28% of graduates, N=10).

3. *The program's screening process*

The selection and admission processes vary from program to program but include similar components, for example: **verifying suitable educational background, personal or group interviews and preparing a short lesson and teaching it.** Approximately 61% of the students (N=56) and approximately 66% of the graduates (N=21) felt that the program's screening process was successful in selecting students who were suitable for the program profile. Approximately 34% of the students (N=31) and approximately 31% of the graduates (N=10) thought that the process succeeded in this to a certain extent. Approximately 78% of the students and approximately 72% of the graduates (N=23) would not change the program's screening process.

4. *Attitudes towards the training program*

4a. Attitudes towards the academic portion of the training program

It appears from the findings that both the students and the graduates expressed positive opinions regarding the academic courses: 74% of the students (N=59) and 70% of the graduates (N=23) noted their satisfaction with courses in mathematics. 85% of the students (N=74) and 61% of the graduates (N=20) noted that the pedagogic courses contributed to their training. In particular, the students felt that there was correspondence between their studies in pedagogic courses and their experiences in school (78% of the students, N=62, in contrast to 39% of the graduates, N=12). Also 88% of the students (N=73) noted that they had an opportunity to raise issues from their experiences in school and discuss them in the courses and workshops. The students also related to the fact that they often had difficulty implementing what they learned in the

academic courses in classes learning on a level lower than four or five study units, and that they preferred a broader treatment of pedagogy of mathematics teaching and less theoretical material.

4b. Attitudes towards experience in school during the training program

The purpose of the "Teaching Plus" program is to train teachers for mathematics teaching at the higher levels of secondary education. From the reports of the students and the graduates it appears that the experience in school as part of the training program allows most of the student-teachers to be exposed to senior high school students: students mainly conduct their practical work in Grade 10 (81%, N=64), Grade 11 (73%, N =58) and Grade 12 (51%, N=40). Some also had experience working in junior high school, mainly in Grade 9 (44%, N=35). The graduates had experience mainly in Grade 8 (56%, N=18), Grade 9 (53%, N=17), Grade 10 (53%, N=17), and Grade 11 (56%, N=18). Fewer graduates had experience in Grades 7 and 12 (38% in each of these grades, N=12), so that within the training framework, the students had more practical experience in senior high school than the graduates. With regard to the academic level at which the students and graduates had practical experience, it seems that most of them practiced teaching with students at higher levels: most at the level of five study units (84% of students, N=65 and 66% of the graduates, N=19) and at the level of four study units (70% of the students, N=54, and 66% of the graduates, N=19). Some of the students and the graduates also gained experience teaching students studying three study units (62% in both groups, students: N=48; graduates: N=18). The findings therefore indicate that within the training more students had experience with students at the level of 5 study units than did graduates.

The most frequent activities performed in the school practicum, as reported by the students (that took place at a frequency of six times or more per annum) included: observation of the teacher-instructor's lesson (81%, N=59), individual teaching of students (49%, N=35), preparing a lesson plan (45%, N=33), conducting a discussion with an effective strategy for class management (32%, N=23) and work with a small group of students (30%, N=22). Nevertheless, it appears from the students' responses that there are differences between the programs and that some of the students performed these activities at a low frequency, or did not perform them at all. A large proportion of the students reported that they did not engage in the following activities: construction of an individualized learning program for a pupil (82% of the students, N=58 reported that they did not perform this at all), drafting an exam for students (75%, N=53), conducting a

discussion on students' progress in the class (63%, N=45), providing a response for the pupil on his progress (58%, N=42), inspecting students' exams (52%, N=37) and receiving written feedback following an observation of their lesson (49%, N=35).

From the students' responses and also from the interviews it is obvious that there **are differences between different schools in terms of scope and manner of experience.** There are schools in which students are involved in different activities in the school such as staff meetings, individual work with students and grading tests, all of this in addition to teaching as part of the training program. In other schools the practical work includes only classroom teaching. It is also obvious that there is a difference in the number of practice lessons taught by students, ranging from two-three lessons to six-ten lessons per year.

75% of the students (N=58) reported that the guidance that they received was flexible according to their needs and 70% of the students (N=53) reported positive correlation between the guidance they received and the contents of the theoretical courses that they had studied in the training program. 59 of the students who responded to the questionnaire, defined successful guidance as mainly including the following characteristics: guidance which included personal consideration, direction and support (19 students), guidance for planning and delivering lessons (18 students), and guidance including practice in various activities (7 students). 32 graduates who responded to this question, like the students, felt that the need for guidance during the training course included help with lesson preparation, observation of lessons and providing feedback (10 graduates), support with difficulties (9 graduates) and guidance encompassing different experiences and activities in the school (5 graduates).

5. Clinical teaching in the training program

The students and graduates were asked in an open-ended question whether they consider clinical teaching to be part of the the program, for example adapting teaching to the thinking and learning to the diverse variety of students. Most of the students who responded (79%, N=56) noted that the program included some training for clinical teaching, especially in the theoretical courses and workshops, such as classroom management and learning disabilities and also during their school practicum which included coaching for teaching heterogeneous classes. As part of their school-based training the students prepared lesson plans suitable for a diverse group of students and were given opportunities to relate to different dilemmas involved in adapting the teaching

to suit these students. The students also noted that they learned how to explain the learning material in different ways and to encourage creativity and thinking.

15 students (21%) noted that the training program did not cover teaching adapted to different levels. From their responses it appears that they defined the term "adaptation of the teaching" as the teaching of weaker students studying less than five units and they did not relate to the possibility of attempting clinical teaching for students studying four and five units. These students noted that they did not have the opportunity to try to teach heterogeneous students or classes with varied levels of study units in mathematics.

In the interviews, the teacher-instructors noted that some of the students that they observed implemented components of clinical teaching—for example explanation or solution of an exercise in different ways. Nevertheless, most of the teachers noted that since the students are not experienced in teaching and are not very familiar with the students in the classes where they taught, it is reasonable to expect that at this initial stage they will use clinical teaching only infrequently.

According to the perceptions of the graduates, the important actions in teaching include components of clinical teaching such as adaptation of the teaching method to suit a diverse group of students (90%, N=27). Graduates graded actions such as use of technology for teaching (65%, N=20) and construction of a pupil's personal learning program (43%, N=12). as unimportant

Internship

In an open-ended question, the students were asked what sort of guidance they would like to receive from the program during and after their internship. 51 students, who responded to this question related in particular to their desire to continue to receive general coaching and guidance from the program in the form of consultation, deliberation, problem-solving and help with decision-making (17 students). Some related to the possibility of an internship workshop with the original group composition from the training program (10 students) and to continued observation of their lessons and feedback from the program staff (6 students). Students primarily requested coaching in areas such consutructing lesson plans (5 students), and coping with students who have difficulties in class or have discipline problems (4 students).

Of the 21 graduates who responded to this question, 18 were still in their internship year, and 4 of them noted that they did not need guidance. Other graduates requested guidance that would focus on meetings with experienced teachers for peer learning (3 graduates)

and three other graduates noted that they received the necessary guidance within the school framework.

In the interviews, both the students and the graduates noted the importance of guidance for new teachers. Some of them noted that it was preferable for this to be given within the school framework and some preferred a setting that was outside the school, for example guidance within the training program.

7. Graduates today

The graduates were asked about the classes and academic levels that they were teaching in the current year (2016). Most of the graduates who responded to this question were teaching in senior high schools in Grade 10 (20 graduates), in Grade 11 (16 graduates) and in Grade 12 (11 graduates). Some of them also taught in junior high school, mainly in Grade 9 (14 graduates). In Grades 7 and 8, 10 graduates taught in each grade. Most of the graduates who responded to this question were teaching at the level of five study units (20 graduates). The graduates also teach at the level of three study units (16 graduates) and four study units (11 graduates).

Future plans

The students and graduates were also asked about their plans for the coming academic year (2017). Their responses indicate that most of the students and the graduates plan to continue to teach in the coming academic year. Approximately 67% of the students (N=12) will combine teaching with additional work. 5 students will continue their studies, 2 students will transfer to other work and 6 students still do not know where they will work next year.

Of the students who will continue their internship in the next year, most of them will teach in senior high school in Grade 10 (31 students) and in Grade 11 (24 students) and some of them also in Grade 12 (15 students). There are students who will perform their internship also in junior high school in Grade 7 (15 students) in grade 8 (7 students) and in Grade 9 (10 students). The graduates who will continue to teach will mainly teach in senior high schools in Grade 10 (16 graduates), in Grade 11 (15 graduates) and in Grade 12 (7 graduates). Some of them will also teach in junior high school in Grade 9 (12 graduates) and Grade 7 (9 graduates) and Grade 8 (5 graduates). From these data it appears that both the students and the graduates who completed the questionnaire have successfully integrated in teaching in senior high schools.

23 students will teach at the five-unit level, 24 at the four-unit level and 28 at the three-unit level of three study units. Of the graduates, 15 will teach at the level of five-units, 10 at the level of four units and 11 at the three-unit level. It therefore seems that some of the students and graduates who responded to the questionnaire have successfully integrated in the teaching of students studying high level of 4-5 study units.

Most of the interviewees noted that a new teacher will find it difficult to teach at the level of five study units, due to their lack of experience and also because experienced teachers do not want to vacate their posts for new teachers. Given that the goal of the programs is to train teachers to teach at higher levels and the difficulty that some teachers and graduates find in integrating in teaching such classes, the teachers and graduates suggested that **there should already be some expectation management** during the training course. This clarification of expectations should include raising awareness to the difficulty involved in integrating in teaching at higher levels at the beginning of a teaching career.

Difficulties

The main difficulties that the students observe at the inception of their teaching in school include taking care of exceptional students (57%, N=41), coping with discipline problems (47%, N=35) recognition (or lack of it) of their previous years of experience (44%, N=31) and teaching in heterogeneous classes (37%, N=27). The graduates noted similar difficulties in their present work: recognition of their previous years of experience (50%, N=15), coping with discipline problems (47%, N=14), treatment of exceptional students (40%, N = 12) and teaching in heterogeneous classes (37%, N=11). Additionally, in practice, graduates find themselves teaching classes of relatively weak students, alongside classes of stronger students, and, as emerged from previous findings, some of them feel that they do not have sufficient tools to do this due to the character of the training program that specifically aims to train teachers for teaching at higher levels.

In the interviews, both current students and graduates of the program raised additional difficulties. These include **lack of alignment between the academic college year and the school year**,(so that the time when the students can experience teaching in school is relatively limited and often ends in the spring); **not enough time spent in school** (one day a week does not allow them to observe the development of subjects and the teaching sequence); **changes in the character and work environment of the teachers who have undergone retraining** in relation to their previous work environment to which they had become accustomed; **difficulty integrating into the education system as new**

teachers; and **difficulty having their previous experience and years of work recognized** (lack of recognition influencing the teacher's pay and consequently also influencing the motivation of some of them to teach); **lack of publicity and lack of familiarity with the "Teaching Plus" network** in **the school has consequences for potential employment**, making it difficult for the students to find suitable teaching posts; **lack of familiarity with the education system,** especially education reforms and behaviors relating to conditions and wages.

F. Recommendations

The screening process

1. **The students' profile**: we recommend considering whether to admit students who do not have degrees in mathematics-based disciplines, some of the interviewees feeling that these students suffered from a gap in mathematical knowledge. Additionally, students' previous knowledge is related to the recognition of their experience upon their entry into the education system: students who do not have degrees in mathematics-rich disciplines report that they find it difficult to obtain recognition of their previous experience.
2. **The screening process**: It was found that different methods are used to select the students, including, for example, examining whether they have an appropriate education background, a personal or group interview and/or preparing a short lesson and teaching it. We recommend finding out which is the most effective selection method and making the screening methods in the "Teaching Plus" network uniform in line with that method. It is also advisable to test this issue again in another few years, according to the number of graduates who persevere in teaching, so that it will be possible to identify which selection processes are able to identify the most suitable students.

Academic training

1. **The academic part of the training**: most of the students and the graduates noted that the courses in mathematical content-knowledge were in their view satisfactory and that the pedagogic courses contributed to their training. Some of the students noted that they would prefer broader consideration of the pedagogy of mathematics teaching, and less theoretical material. In light of these opinions, there is room to consider adding courses on pedagogic subjects, and also additional courses on classroom management, coping with problems of pupil

discipline and teaching heterogeneous classes, all of which were subjects mentioned by the students and graduates as some of the difficulties with which they coped during their teaching.

2. **Managing expectations regarding placement for internship:** due to the difficulty in finding placements for new teachers at the five-unit level, it is recommended that efforts are made to manage students' expectations regarding placement during the training. This may help them to be more patient regarding their placement within the school system, and to wait until they are accepted to teach classes at a higher level, for which they were trained.
3. **Practicing clinical teaching:** Alongside their practice in classes with the 4-5 unit tracks, it is recommended to demonstrate for the students how they can also implement clinical teaching among students at a lower level of learning.

Practicum

1. **Practicum experience in school during the training program:** since the findings indicated that some of the students found it difficult in the beginning to integrate in teaching of high level classes, and found it difficult to cope with students in lower year groups and learning levels, it is advisable to consider allowing students to experience broader practice including teaching in lower year groups and academic levels.
2. **Difference in practicum experience between the schools**: the findings indicate that there is difference in the extent and manner of practice by the students between the different schools. Given these differences, we recommend considering whether it is worth determining several "core experiences," apart from the observation and teaching of lessons—for example individual teaching, participation in staff meetings, grading exams—which should be shared and uniform for all the "Teaching Plus" programs. We also recommend determining the desirable minimal number of practice lessons and the maximum number of students per trainer-teacher.
3. **Coordination between the academic year in the education system and the academic year in the college**: a difficulty emerged from the findings regarding the lack of coordination between the education system's academic year and the academic year in the training course, which meant that students could not practice teaching after the Passover vacation and sometimes even after Purim. For

this reason we recommend considering integrating the students in additional activities in the school during those months, for example individual or group help in teaching for the Matriculation exams for students who have difficulties.

4. **Guidance during the training and practicum:** We recommend learning from experience of the graduates and the early students of the "Teaching Plus" programs regarding which components of the coaching particularly contributed to their first years of teaching.
5. **Publicity for the program:** Perhaps broader publicity for the "Teaching Plus" network among the schools with potential for integrating new teachers would help the students in their search for a practicum and in finding suitable teaching posts; we therefore recommend acting to widen familiarity with the network's programs in different schools.

In conclusion, the "Teaching Plus" network discussed in this research report, is composed of eight different models of assimilation. The programs are based on similar principles but there are differences between them in the screening process, and in the structure and scope of the theoretical and pedagogic courses, in the manner of assimilation in practice in the schools and in the character of the supervision provided by the teacher-instructors and pedagogic instructors during the training year and the practicum year.

The students and the graduates who participated in the research testified overall that they were very satisfied with the retraining programs and some of them had already succeeded in their first year to integrate into teaching five units. Nevertheless, since this is a network of programs with uniform goals and principles, we suggest considering whether it would be worthwhile to create greater uniformity between the different programs in the network, Based on the graduates' stories of success in order to ensure that these retrained teachers can find employment and remain within the system and, over time, can succeed in enlarging the circle of students studying five study units in Israel.