



Committee for the Evaluation of Mathematics Study-Programs

The Open University Evaluation Report

August 2010

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Chapter 1 - Background

At its meeting on October 07, 2008 the Council for Higher Education (CHE) decided to evaluate study programs in the fields of mathematics during the academic year 2009-2010.

Following the decision of the CHE, the Minister of Education, who serves ex officio as a Chairperson of the CHE, appointed a Committee consisting of:

- **Prof. Benedict H. Gross**, Mathematics Department, Harvard University, USA - Chair
- **Prof. Ronald Coifman**, Department of Mathematics and the Department of Computer Science, Yale University, USA
- **Prof. Hillel Furstenberg (emeritus)**, Department of Mathematics, the Hebrew University, Israel
- **Prof. Gerard van der Geer**, Korteweg-de Vries Institute for Mathematics, University of Amsterdam, the Netherlands
- **Prof. David Jerison¹**, Mathematics Departments, Massachusetts Institute of Technology, USA
- **Prof. Yakar Kannai**, Department of Mathematics, Faculty of Mathematics and Computer Science, Weizmann Institute, Israel

Ms. Noa Nof Steiner - Coordinator of the Committee on behalf of the Council for Higher Education.

Within the framework of its activity, the Committee was requested to:²

1. Examine the self-evaluation reports, submitted by the institutions that provide study programs in mathematics, and to conduct on-site visits at those institutions.
2. Submit to the CHE an individual report on each of the evaluated academic units and study programs, including the Committee's findings and recommendations.
3. Submit to the CHE a general report regarding the examined field of study within the Israeli system of higher education including recommendations for standards in the evaluated field of study.

The entire process was conducted in accordance with the CHE's Guidelines for Self-Evaluation (of October 2008).

¹ Prof. David Jerison did not participate in the second round of visits.

² The Committee's letter of appointment is attached as **Appendix 1**.

Chapter 2 - Committee Procedures

The Committee members received the self-evaluation reports in November, 2009, and discussed them via email.

The Committee held its first meeting on January 3, 2010, during which it discussed fundamental issues concerning higher education in Israel, the quality assessment activity, as well as mathematics study programs.

In January 2010, the Committee held its first cycle of evaluation, and visited the Open University, the Hebrew University, Tel-Aviv University and the Technion. In May 2010 the Committee conducted its second evaluation cycle, and visited Haifa University, Bar Ilan University and Ben-Gurion University of the Negev. During the visits, the Committee met with various stakeholders at the institutions, including management, faculty, staff, and students.

This report deals with the **Mathematics Division, the Department of Mathematics and Computer Sciences at the Open University of Israel.**

The Committee's visit to the Open University took place on January 04-05, 2010. The participating Committee members were Prof. Benedict H. Gross, Prof. Hillel Furstenberg, Prof. Gerard van der Geer and Prof. Yakar Kannai. The schedule of the visit, including the list of participants from the institution, is attached as **Appendix 2.**

The Committee thanks the management of the Open University and the Division of Mathematics for their self-evaluation report and for their hospitality towards the Committee during its visit at the institution.

Chapter 3: Evaluation of the Mathematics Division, the Department of Mathematics and Computer Sciences at the Open University of Israel

** This Report relates to the situation current at the time of the visit to the institution, and does not take account of any changes that may have occurred subsequently. The Report records the conclusions reached by the Evaluation Committee based on the documentation provided by the institution, information gained through interviews, discussion and observation as well as other information available to the Committee.*

Background

The Open University of Israel (OUI) is a unique academic institution, dedicated to bringing higher education to various groups that might otherwise be denied it, both by developing high-quality academic materials suitable for independent learning, as well as by implementing means to support distance learning.

OUI students enroll in individual courses, rather than departments or programs, and are counted as part of a structured program only after completing a certain amount of its obligatory courses. During the 2007-2008 academic year, about 44,500 students were enrolled in undergraduate courses at the OUI, and about 3,200 to graduate courses (in Full Time Equivalents terms, the student population of the OUI was about 18,500 at the undergraduate level and 1,300 at the graduate level courses). While the bulk of the student body lives inside Israel, for example students who live in the periphery and individuals on active duty in the IDF, students from outside Israel (both Israelis abroad and non-Israelis) take advantage of OUI courses as well.

Mathematics courses were available in the OUI since 1976, and its B.Sc. programs in mathematics opened in 1997. In the academic year of 2007-2008, over 6,000 students were registered in undergraduate courses at the Mathematics Division, and 11 graduates received their B.Sc. degree in mathematics.

Mission and Goals

According to the self-evaluation report, the aim of the Mathematics Division is to complement the existing Israeli system of university-level mathematics studies, by providing an additional path, open to all interested and capable individuals, that will grant them balanced mathematical foundations through individual distance learning.

In broad terms, the goals of the Mathematics Division have been met admirably. The courses are available to a very wide population, including many that for one reason or another would not be able to participate in a BA level program in a standard university. Among the latter are soldiers and bright high school students (special care is taken to ensure that high school students are admitted only if they are ready both academically and socially). The Division offers two categories of courses: mathematics for mathematicians and mathematics for non-mathematicians. In 2008, both groups had roughly the same number of registrants: 3,282 in the former category and 3,280 in the latter. The Committee has been told that the large number of participants has not brought about a lowering of standards, due to the rigor in examination procedures. Each examination is seen by several department members and tutors are not told the contents in advance.

Teaching and Learning

The Mathematics Division offers study programs towards B.Sc. degrees in Mathematics, in Sciences with an Emphasis on Mathematics, in Mathematics and Computer Sciences and double track programs in Mathematics and an extra-departmental discipline. Its academic staff consists of 3 senior faculty members, 15 course coordinators and 75 external tutors.

The basic unit of instruction is a "course" (About 700 of these are offered at OUI). The courses' content and required materials are detailed in textbooks, designed for self-study and prepared by faculty members from the OUI, with the help of experts outside the University. The preparation and revision of texts is the primary responsibility of the faculty. Constant revision is the norm, and current revisions are taking place in Calculus and Algebra. Much of the success of the OUI mode of operation is attributed to the high quality of these textbooks, which enjoy an excellent reputation. These are often recommended in courses given at other universities as well.

The course coordinators, under the supervision of senior academic faculty members, are in charge of bringing the material to the student, whether by way of occasional lectures, assigning readings and exercises, as well as organizing the next level of instruction, which is carried out by the tutorial staff. There are currently 15 course

coordinators, about half of whom hold Ph.D. degrees. The lectures reach a broad audience by virtue of video transmission, which also allows the student to hear a lecture at a time convenient to him/her. Course coordinators typically do not meet the students face to face, but a student with questions can direct these to the coordinator by e-mail, telephone, or SMS.

The course coordinators organize a retinue of tutors, who are the ones who meet the students face to face in study centers with numerous locations in Israel. The number of tutors is proportional to the number of students registering in a course, with the intention that no more than 20 or 25 students are in the same tutorial class (when 20 or fewer students attend a course, or if a suitable tutor is unavailable, the coordinator serves as tutor as well and there is a single study center). Students are not required to attend tutorials, but some 80% do avail themselves of this service. Many students study the material in the book twice, first before meeting with their tutor and again afterwards.

A unique feature of the learning at OUI is the systematic use of advanced technology. Video rooms are available for lectures which can be listened to in real time, or recorded for future listening on the university's website. By electronic means of communication, the course coordinators are within easy reach of students, and can quickly answer questions. All questions are publicized on the web, and the instructor may choose to delay answering, thereby providing a challenge to other students.

An issue relating to the open admission policy of the OUI is the difficulty in conveying to the entering student the challenging nature of mathematics and in providing a realistic picture of his or her likelihood to succeed. The result is a high dropout rate, whereby a significant percentage of students don't take the final examination. The Committee holds the opinion that the Mathematics Division could somewhat remedy this situation, by adjusting some of the material in the introductory courses.

The Committee recognizes that counting the number of graduating students at the OUI gives only a partial measure of their success, as some of their students enroll in standard undergraduate programs at other universities in Israel. The Committee had

some difficulty in distinguishing this group of students from those who had simply dropped out of study, as the Institution was not tracking its past students, but it holds the opinion that OUI mission is nonetheless accomplished if a student is enrolled in another University and gets credit for work done at the OUI. Consequently, the small number of students who actually graduate doesn't indicate correctly on OUI success in accomplishing its mission.

Research

The institutional policy of OUI since its inception has been – as in any university – to "produce new knowledge". The efficiency of the operation at the OUI enables it to bring instruction to a large population with a relatively small number of faculty members. This has its economic advantages, but one major disadvantage is that it is difficult to sustain a research atmosphere in an institution with few mature, active researchers. Among those who suffer from this situation are the course coordinators who wish to do research in mathematics – indeed must do so to rise to the highest rank of this level – and are forced to find mathematical collaboration elsewhere. Altogether, there is some ambivalence in the signals sent to the younger members of the department aspiring to advance, as to where to concentrate their efforts – on mathematical research or on the development of courses and other ways of enhancing instruction. The committee was told that hiring of faculty is first filtered through a research prism, then the writing and teaching of the candidates were considered. The Committee wondered if this was the optimal way to get the people best suited to teach at the OUI. Although the Division does offer some possibility of time off for research in the form of a 6-month leave, there should be a broadened institution of Sabbaticals made available to the course coordinators. The opportunity to refresh their mathematical knowledge will help provide better teaching in the future.

In order to enhance its research atmosphere, the Mathematics Division is interested in opening a Master's program, so that young mathematics students could work together with older researchers. The Committee feels that at present the Division lacks the manpower required to offer this additional degree. It might also dilute the essential outreach mission of the OUI, and the committee felt that it would be more appropriate to utilize the existing Master's programs at neighboring Universities.

Faculty

The Committee felt that the communication is weak between the various teaching levels. Tutors should be working together and coordinating their work more than they do (although some feel this is unnecessary inasmuch as all of them follow the same textbook). The voice of the tutors is not always heard by those above them in the hierarchy, and so there may be useful input that is being ignored. It was also observed that there is no mechanism for calling attention to an outstanding student, ensuring that he or she receives the proper advice, nor a formal way within the system of answering questions students may have that don't relate to a specific course. The Committee also holds the opinion that there is room for creating more community among the students, especially by using the resources of the web.

A major problem relating to the employment conditions of the tutors has to do with the funding model of the institution. Currently 70-75% of the OUI budget is paid for by tuition money coming from students who register in courses. Since students can register until two weeks before the beginning of a semester (and sometimes even later), tutors who need to ready themselves for the teaching ahead and to secure their income, are left hanging as to whether and what they will teach. It is particularly awkward that tutors must renegotiate their contracts each semester. The Committee felt that a great progress in labor relations would be obtained by extending the tutors a long-year contract.

Infrastructure

The Committee took a tour of the facilities at the OUI and met with the administrative staff. The physical operation and warehousing of texts, as well as the administration of exams, registration for courses and distribution of material by post – all take place on an enormous scale and are very efficient.

Summary and Recommendations

The committee was enormously impressed with the physical operation of the OUI, as well as with its admirable mission of reaching out to students who were unable to attend a traditional University. The committee is also impressed by the overall quality of the textbooks and the level of the exams.

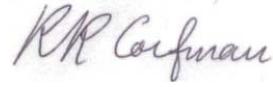
The Committee recommends as follows:

1. The University settles its ongoing labor dispute with the tutors as quickly as possible, as the current instability in contracts is unsustainable.
2. The Committee believes that the OUI should continue to abide by its central mission and focus on excellence in undergraduate teaching. In light of the small number of senior faculty members and the declared obligation to undergraduate education, the Committee holds the view that the introduction of a Master's degree does not seem appropriate at this time.
3. Promotion criteria should be clarified by the administration at all levels, with realistic (and not overly ambitious) research expectations.
4. More cooperation is required with other universities in Israel, both at the faculty seminars and the placement of students.
5. The Mathematics Division should consider adjusting some of the material in the introductory courses, in order to alleviate the issue of the high drop-out rate.
6. A broadened institution of Sabbaticals should be made available to the course coordinators, in to refresh their mathematical knowledge and help them provide better teaching.

Signed by:



Prof. Benedict Gross, Chair



Prof. Ronald Coifman



Prof. Hillel Furstenberg



Prof. Gerard van Geer



Prof. David Jerison



Prof. Yakar Kannai

Appendices

Appendix I- Copy of Letter of Appointment



December 12, 2009

Prof. Benedict H. Gross
Mathematics Department
Harvard University
USA

שר החינוך
Minister of Education
وزير التربية والتعليم

Dear Professor Gross,

The State of Israel undertook an ambitious project when the Israeli Council for Higher Education (CHE) established a quality assessment and assurance system for Israeli higher education. Its stated goals are: to enhance and ensure the quality of academic studies; to provide the public with information regarding the quality of study programs in institutions of higher education throughout Israel; and to ensure the continued integration of the Israeli system of higher education in the international academic arena. Involvement of world-renowned academicians in this process is essential.

This most important initiative reaches out to scientists in the international arena in a national effort to meet the critical challenges that confront the Israeli higher educational system today. The formulation of international evaluation committees represents an opportunity to express our common sense of concern and to assess the current and future status of education in the 21st century and beyond. It also establishes a structure for an ongoing consultative process among scientists around the globe on common academic dilemmas and prospects.

I therefore deeply appreciate your willingness to join us in this crucial endeavor.

It is with great pleasure that I hereby appoint you to serve as the Chair of the Council for Higher Education's Committee for the Evaluation of Mathematics Studies.
The composition of the Committee will be as follows: Prof. Benedict H. Gross – Chair, Prof. Ronald Coifman, Prof. Hillel Furstenberg, Prof. Gerard van der Geer, Prof. David Jerison, Prof. Yakar Kannai. Ms. Noa Nof-Steiner will coordinate the Committee's activities.

In your capacity as the Chair of the Evaluation Committee, you will be requested to function in accordance with the enclosed appendix.

I wish you much success in your role as the Chair of this most important committee.

Yours sincerely,
Gideon Sa'ar
Gideon Sa'ar
Minister of Education,
Chairperson, the Council for Higher Education

Enclosures: Appendix to the Appointment Letter of Evaluation Committees

cc: Ms. Riki Mendelzvaig, Secretary of the Council for Higher Education
Ms. Michal Neumann, Head of the Quality Assessment Unit
Ms. Noa Nof-Steiner, Committee Coordinator

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Appendix 2- Site Visit Schedule

**The Committee for the Evaluation of Mathematics Study Programs -Schedule
of site visit at the Open University Campus, Raanana
All meetings will be held at the Guest Center conference room**

First day: Monday, January 4, 2010

Time	Subject	Participants
09:30-10:30	Opening Session: Meeting with the heads of the institution and department	
	President	Prof. Hagit Messer-Yaron
	Vice President for Academic Affairs	Prof. Judith Gal-Ezer
	Dean of Academic Studies	Prof. Sonia Roccas
	Dean of Research	Prof. Anat Barnea
	Dean of Academic Development and Educational Technology	Prof. Yoav Yair
	Mathematics Division	Prof. Eli Levin
	Director General	Mr. Amit Streit
	Dean of Students	Dr. Haim Saadon
	Head of the Evaluation Department	Dr. Relly Brickner
CHE Quality Assessment Coordinator	Dr. Ronit Bogler	
10:30-11:15	Meeting with the academic leadership of the Math Division (senior professor)	Prof. Eli Levin, Dr. Zippy Berger
11:15-12:00	Tour of the Campus: Recording studios, Logistic Center, Library, Computer Class, Auditoria, Senate Hall, Lamda Bookstore	Guided by Prof. Yoav Yair (Dean of Academic Development and Educational Technology)
12:00-13:00	Lunch with the senior faculty of the Math Division and representatives of the CS Division	Prof. Eli Levin, Dr. Zippy Berger, Dr. Gil Alon (Math) Prof. Judith Gal-Ezer, Dr. Anat Lerner (CS)
13:00-13:45	Meeting with Math Senior Faculty and representatives of relevant committees:	Prof. Eli Levin (MC, chair SP, ACCR),
	Math & CS Committee (MC)	Dr. Gil Alon (MC),
	Study Program Approval Committee (SP)	Dr. Zippy Berger (SP, ACCR, HS, MC),
	Accreditation Committee (ACCR)	Dr. Manor Mendel (MC, chair CS2),
	CS Master's program Steering Committee (CS2)	Prof. Miriam Souroujon (APP),
	Academic Appointments Committee (APP)	Dr. Aviad Bar-Haim (chair ACCR),
	Dean's unit for high school students' affairs (HS) (There is no Undergraduate Admissions Committee at the OUI)	Rachel Rimer (Head HS)
13:45-14:30	Closed-door working meeting of the committee	

Second day: Tuesday, January 5, 2010

Time	Subject	Participants
09:30-10:15	Meeting with Math tutors*	Ilon Ben Shmuel; Dr. Yossi Cohen; Dr. Mira Gonen; Dr. Eyal Faragy; Regina Israeli; Lior Kamma; Dr. Sara Mayberg; Ilan Yanuv; Dr. Romina Zigdon
10:15-11:15	Meeting with undergraduate students *	Jonathan Afek; David Azriel; Lear Bahak; Shachar Carmeli; Jasmine Feingold; Lior Friedman; Arie Hacohe Ben-Porat; Shahar Hemdat; David Katzin; Dor Minzer; Jonathan Rosenshein; Oren Sarig; Jonathan Woodbridge (Some students may be unable to attend)
11:15-12:00	Meeting with junior academic staff *	Dr. Zippy Berger; Frida Chinkes-Verbin; Liat Friedlaender; Dr. Vadim Grinshtein; Dr. Ofer Hadas; Itai Hareven; Naomi Milano-Rosenthal; Yehezkiel Neumann; Dr. Yoni V. Stanchesu
12:00-12:30	Meeting with administrative staff	
	Director General	Mr. Amit Streit
	Head, Human Resources Administration	Mr. Joseph Maori
	Director, Teaching Services System	Ms. Chana Klein
	Secretary of the Mathematics Division	Ms. Orit Zaltsman
12:30-13:30	Lunch and closed-door working meeting of the committee	
13:30-14:15	Summation meeting with the academic leadership of the Math Division **	Dr. Daniela Leibowitz, Prof. Eli Levin
14:15-15:00	Summation meeting with heads of the institution and of the department	
	President	Prof. Hagit Messer-Yaron
	Vice President for Academic Affairs	Prof. Judith Gal-Ezer
	CHE Quality Assessment Coordinator	Dr. Ronit Bogler
	Chair, Mathematics Division	Dr. Daniela Leibowitz
	Chair, CS Division	Dr. Anat Lerner

Coordinator – Ms. Shelly Sternberg-Lahav; Phone #09-7782208 or 052-5351201