The Committee for the Evaluation of Statistics Study-Programs

The Hebrew University of Jerusalem Evaluation Report

May 2010

Contents

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 statistics 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. Abba M. Krieger, Statistics Department, Wharton School, University of Pennsylvania – Committee Chair**
- **Prof. Peter Bickel, Department of Statistics, University of California, Berkeley**
- **Prof. Onno Boxma, Department of Mathematics and Computer Science, Eindhoven University of Technology**
- **Prof. Robert Adler, Faculty of Industrial Engineering and Management and the Faculty of Electrical Engineering, the Technion**

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:[1]

1. Examine the self-evaluation reports, submitted by the institutions that provide study programs in statistics , 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] The Committee's letter of appointment is attached as **Appendix 1**.

Chapter 2 - Committee Procedures

The Committee members received the self-evaluation reports in February, 2010, and discussed them via email.

The Committee held its first meeting on March 7, 2010**,** during which it discussed fundamental issues concerning higher education in Israel, the quality assessment activity, as well as statistics study programs.

In March 2010, the Committee visited the four institutions offering statistics study programs, at Tel-Aviv University, Haifa University, the Hebrew University and Bar-Ilan University. During the visits, the Committee met with various stakeholders at the institutions, including management, faculty, staff, and students.

This report deals with the **Department of Statistics at the Hebrew University of Jerusalem.**

The Committee's visit at the Hebrew University took place on March 15-16, 2010. 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 Hebrew University and the Department of Statistics for their self-evaluation report and for their hospitality towards the Committee during its visit at the institution.

Chapter 3: Evaluation of the Statistics Department at the University

** 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.*

Introduction

The Department of Statistics in the Hebrew University of Jerusalem resides within the Faculty of Social Sciences. During the 2008-09 academic year, the Hebrew University student population was over 22,000, of whom roughly 11,500 were at the undergraduate level and nearly 9,200 at the graduate level. The same academic year, 72 undergraduate students, 10 masters level students, and 4 doctoral students enrolled in the Department, and it granted 29 BA degrees, 9 MA degrees and 3 PhD degrees.

The Department has a strong focus on the field of statistics (as opposed to operations research and applied probability), covering a broad range of theoretical and applied topics including biostatistics and machine learning. Two faculty members work in the areas of stochastic operations research and applied probability.

The Committee was impressed by the excellent quality of the research done in the Department; this Department can compete with the best statistics departments in the world. This is remarkable in view of the environment in which it operates: a difficult financial situation which is adversely affecting both teaching and research in many ways; a somewhat isolated position within the Faculty of Social Sciences; and the fact that the university has several campuses.

At its peak, the Department had over 20 faculty members. Presently, it has 13 faculty members, one of whom also has a 0.5 appointment in the Faculty of Science.

Our report is based on the self-evaluation of the department and a two-day site-visit. The self-evaluation provided much useful information; issues which were not yet clear to us from the self-evaluation report were clarified during the discussions.

Environment

The Department of Statistics at the Hebrew University of Jerusalem resides within the Faculty of Social Sciences. The faculty members of the Department see the following dilemma. In their research orientation, they are closer to the Faculty of Science, and in particular to the Mathematics and Computer Science Departments. This is especially true of the younger faculty members. However, there is some concern that a move to the Faculty of Science would not be beneficial in terms of the availability of open slots for the hiring of new faculty members. Nevertheless, we strongly recommend that this move be considered.

Another problem that negatively affects the Department is the fact that the University operates on five campuses. The Faculty of Social Science resides on the Mount Scopus Campus, whereas the Faculty of Sciences resides on the Edmund J. Safra campus in Givat-Ram. It takes at least 30 minutes to move from one campus to another, which seriously impedes collaboration and joint seminars with colleagues in the Mathematics and Computer Science Departments. The distance also reduces the motivation of students in computer science and mathematics and other exact sciences to attend advanced courses in the Statistics Department.

The Center for Rationality is a natural source of excellent graduate students for the Department. It is also on the Safra campus, and although there has been some recruitment from the Center, its distance also acts as a hindrance. An extra burden is the fact that several core statistics courses are being taught in the Edmund J. Safra campus. The distance to the Ein Kerem campus hinders collaborations with the medical school.

Faculty

Three of the current thirteen faculty members were hired in 2006-2008, all returning from a postdoc position abroad. The Department faces five retirements (4.5 FTE) in the next six years. The eight remaining faculty members are extremely strong, but the Department is clearly confronted with a major problem. Even the present faculty size is small, both from the viewpoint of critical research mass and from the perspective of teaching load; the average teaching load is 12 hours per year, which is quite high.

Recruiting new faculty members is not going to be easy (this is a common problem facing all Israeli statistics departments, and we will discuss it in the general report). The Department justifiably aims to maintain very high standards, and there is not a large pool of candidates from which to recruit.

There is a feeling within the Department that the present recruiting policy of the University does not offer much flexibility for a department that is faced with the above-mentioned problems. The Department competes for slots with other departments of the Faculty of Social Sciences and, in addition, the University is under much financial pressure. However, on the positive side, the administration seems aware of the difficult situation of the Department and in the last four years four offers were made, three of which were accepted.

We note that two of the new faculty hold PhDs not in statistics or in mathematics with an emphasis on applied probability theory, but in disciplines with which statistics is becoming more and more intertwined; specifically computer science and electrical engineering. We applaud these moves which bring the Department to the emerging areas of statistics which border computer science and engineering and the life sciences. This too will be discussed further in the general report.

Research

The research being carried out by the Department is typically at the highest levels, and the University should be proud of this Department. Some of the work is in core topics of statistics, and some of it is interdisciplinary. Areas in which members of the Department have made significant contributions in the last few years include biostatistics, applied probability, sequential analysis, bioinformatics and machine learning.

Overall, the Committee found the balance between theory and application, and between core and interdisciplinary research, appropriate for a department with the mix of scholars that this one has. The Committee is impressed by both the quality and breadth of the Department's research.

Having said this, we would note that the Department is not large by international standards, and that there remain important areas not currently being covered. This affects the education that the Department can provide at the graduate level more than it affects individual research programs; we shall comment on this later.

We were asked if there are natural links between statistics and the social sciences. In fact, the Department was originally placed in the Social Science Faculty because it arose from demography and social statistics. However, in the last few years the emphasis of the field has changed and has moved closer to the natural sciences. The composition of the faculty has mirrored this change. This again supports our view that the Department should move to the Faculty of Science. For example, the more theoretical research being carried out could benefit from closer cooperation with the Mathematics (e.g. probability) and Computer Science (e.g. machine learning, computational biology) Departments on the Safra campus. Similarly, the research being carried out in biostatistics could benefit from closer cooperation with Biology and Public Health and Community Medicine. A way to broaden the areas of research being covered by the Department might be joint appointments with some of these departments.

Undergraduate programs

The Department is responsible for two kinds of undergraduate courses: service courses to other departments and courses to its own students.

Starting with the service courses, the sizes of the classes have grown. This makes for class sizes that are typically too large. Even more critically, recitation sessions, in which problems are reviewed and questions are answered, have ballooned in size. The ideal size should be no more than 30, but in many cases it is double this number. The result is that the recitation sessions turn into additional lecture classes and there are no real opportunities for students to ask questions.

These service courses are typically taught by PhD students of the Department. In the past, the standing faculty more regularly taught and were more closely involved with these courses, setting syllabi. However, due to the cutbacks in faculty, they rarely teach service courses nowadays, and they lack the time or resources for curriculum

development. Recently, a few client departments have decided to forgo the services of the Statistics Department, and have taken over the teaching of these courses themselves.

There seem to be two separate sets of motivations behind this phenomenon. One is primarily financial. It seems that under the University's internal accounting system, it is financially preferential for departments to teach these courses themselves. The Committee felt that this was a poor reason for giving up on what is obviously preferable from an academic viewpoint – that statistics courses be taught by experts in the area.

The second motivation was the reticence of the Statistics Department to respond to requests by subject area departments to prepare courses that were "suitable" for their students. The members of the Committee are, of course, well aware from their home institutions of this conflict between statisticians who want to teach the underlying principles of their subject, seeing in this a long term investment that will stand the students in good stead, and the demand by client departments for a course tailored to specific, current needs. There is justice in both approaches, and in the end some sort of compromise must be reached. The Committee felt that the Statistics Department was perhaps not reaching out sufficiently to subject-area departments. The result, that client departments are choosing to teach the courses themselves, has a negative effect on the funding of the Statistics Department and is undesirable for purely academic reasons.

Turning to the Department's own undergraduate programs, we note first that these are fine programs, carefully crafted and taught at a rigorous and demanding level. There are, however, a number of concerns associated with the student body. The numbers of undergraduates are relatively small, particularly after the high drop-out rate of the first year. This drop-out rate seems to be due to students who begin the program but are not adequately prepared for studying mathematical subjects at the university level. It is not clear how to handle this problem. One obvious possibility would be to raise the entrance requirements into the program, on the assumption that high matriculation and psychometric exam grades would lead to a higher success rate. However, we were told that these are not good indicators of success. Another approach, that apparently

has worked well in other departments in the Faculty, is to adopt some form of tutoring (perhaps by later year students) to help the first year students cope with the move from high school and army to university. It is not clear to the Committee what is the best approach, but it does believe that this problem needs to be solved, or at least alleviated. This is not just important in order to solve the drop-out problem, but to face the issue, raised continually, of the low mathematical level of even those students who remain in the program after the first year. This situation might be alleviated by the proposed move to the Faculty of Science.

Returning to the issue of size, it is clear that undergraduate statistics programs are not as popular as, for example, programs in computer science (which students typically see as more employment oriented) or even mathematics (which is just the opposite). One of the main reasons for this is that students do not meet any non-trivial statistical concepts in their high school education (if they meet any at all) and so are not aware of what the subject has to offer, both intellectually and as an employment path. By the time they meet statistics at the university level, they are typically already tied into another program and the price (in terms of additional courses and lost time) is too high for them to consider moving to statistics. A natural way to overcome this is via joint programs with other departments, possible examples being Economics, Computer Science, and Mathematics. All of these, aside from increasing the numbers of undergraduate students, would also help provide feeders into the graduate programs in statistics.

The students we met unanimously advocated for a higher level of mathematics courses, both in their first year and throughout their studies. They also independently voiced strong support for the move to the Safra campus.

In terms of the learning environment, it is unfortunate but seemingly unchangeable that using textbooks in courses is not the culture in Israel. Some faculty members write lecture notes and make them available to the students. However, this is sporadic and, in most cases, students learn primarily from going to lectures, recitation classes and doing homework. In this environment, recitation classes play a critical role, as does the feedback received from carefully graded homework. As noted above, the value of recitation classes has dropped due to class size, and recently a serious

problem has arisen with homework as well. In the past, funds were available to hire graders so that homework could be checked properly. In most classes this is no longer the case, and so mistakes are only caught in exams, when it is generally too late to provide constructive feedback.

Graduate programs

The MA program accepts on the order of 10-15 students per year. These students register in one of five programs, four in the Faculty of Social Sciences (Statistical Methods, Operations Research, Biostatistics, Official Statistics) and one in the Faculty of Science (Statistics in Mathematics and Probability). Each of these programs is small, and many of the students come from other disciplines.

Most of the MA students are not funded and hence work while in the graduate program. More funding should be provided to these students to enable them to complete the degree more quickly.

The mix of courses is good, but, as is the situation in all Israeli Statistics departments, limited in breadth, at least in comparison to leading US departments. The underlying cause of this is the limited size of the faculty. The students did not seem to feel that this was a serious problem, noting that they made up the required number of credit points by taking courses in other areas. Nevertheless, the committee believes that the range of statistics courses should be broadened somewhat, particularly at the senior MA levels. A possible solution to this problem is suggested at the end of the report.

The Department also has a small but active and quality PhD program with about 12 students. These students are generally preparing for an academic career, and their quality is usually very high. Again, while the PhD students are receiving excellent training in their specific areas of research (due to the quality of the faculty), their broader statistical education is somewhat lacking compared to that available in large US departments.

Many of the graduate students we met serve as teaching assistants. They expressed concern about the lack of training and direction in their teaching responsibilities.

Finally, we recommend that the Department make a concerted effort to maintain contact with its undergraduate and graduate alumni. Having affiliated alumni can benefit the department in many ways; e.g. jobs for current students, information on employment trends within the discipline, a sense of community, constructive feedback into the relative value of different parts of the curriculum and, on rare occasions, even financial support.

Statistical laboratory

The statistical laboratory of the Department should serve two main roles. One is in the training of graduate students in the applied aspects of statistics and in statistical consulting. The second is to provide a service to other units within the University in terms of assisting with data analysis and other statistical issues, as well as doing external consulting.

The laboratory, like the Department, has shrunk considerably in staff and in activity level over the past few years, and has been unable to fulfill its educational role. The academic direction of the laboratory is carried out by a senior lecturer of practice at 0.5 FTE. Potential customers often have to be told to come back after 6 months. We believe that the activities of the laboratory should be extended and have the potential to become more profitable and financially self-sustaining. This may require the commitment of the University administration to provide some seed money for 2-3 years, but this would be a worthwhile investment in both educational, societal, and academic terms.

Infrastructure

There are three major items here: support staff, computing facilities, and library facilities. All of these have been subject to substantial cuts as a result of the financial status of the university.

The administrative staff of the Department consists of two persons. They are very dedicated and efficient; both staff and students speak very highly of them.

The computing facilities seem to be adequate, although less than half of the lecture rooms have computer facilities.

The central library has undergone very large budget cuts. For years there has been hardly any budget for purchasing reference books and textbooks.

Summary and recommendations

The Department is functioning at a very high level, under extremely difficult circumstances. It is performing high-quality research, and it has in recent years hired three very talented researchers in areas that are receiving much attention. Nevertheless, its size has shrunk quite dramatically. Our recommendations are:

1. The Department should move to the Faculty of Science. While much of the Department feels itself rather comfortable, and well-appreciated, in the Faculty of Social Sciences, a move to the Faculty of Science on the Edmund J. Safra campus would have considerable advantages with regards to the quality of its students and the interaction with mathematicians, computer scientists, biologists etc. This is particularly crucial for the younger faculty.

2. In view of the returning issue of the location of the Department, and of the five upcoming retirements, the Department should develop a long term development plan. Such a plan should include its research orientation; e.g., the Department is extremely strong in statistics, but has only a few faculty members in operations research and applied probability.

3. It is crucial that the size of the Department does not fall below its current size, and highly desirable that a few positions be added.

4. The Department should take measures to handle the strong heterogeneity in quality of students, in particular in the BA program. A short-term solution would be to permit and indeed encourage the stronger students to take undergraduate mathematics courses in place of the required mathematics courses currently being offered to statistics and economics majors. A long-term solution would be to consider an honors program.

5. The Statistics Department should make an effort to have a stronger involvement of its faculty members in service courses. At least, senior faculty members should supervise the syllabus.

6. All efforts should be made to increase the number of PhD students interested in academic careers. This is important not only for this Department, but for all statistics departments in Israel. Only this will ensure the continuity of statistics and related subjects, so crucial to all areas of research, in Israel.

7. In order to improve the education of research MA and of PhD students in statistics throughout Israel, the committee is proposing the establishment of a country wide series of advanced courses. Treating the small size of Israel as an advantage rather than a problem, the committee believes that such a series will do a lot to overcome the "critical mass" problem that most Israeli statistics departments are facing. More details on this will be given in the general report.

8. The University should provide seed money to reinforce the statistical laboratory. The necessary investment will be minor, but the expected benefits to teaching and research (not only in the statistics department) should be significant.

Signed by:

Prof. Abba M. Krieger,
Chair

Prof. Robert Adler

Prof. Peter Bickel

Prof. Onno Boxma

Appendices

Appendix 1

שר החינוך
Minister of Education
وزير التربية والتعليم

September 8, 2009

Prof. Abba M. Krieger
Statistics Department
Wharton School, University of Pennsylvania
USA

Dear Professor Krieger,

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 Statistics Studies in Israel.
The composition of the Committee will be as follows: Prof. Abba M. Krieger – Chair, Prof. Robert Adler, Prof. Peter Bickel and Prof. Onno Boxma.
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

האוניברסיטה העברית בירושלים
The Hebrew University of Jerusalem

Department of Statistics Schedule

Date	Day	Time	Meeting
15/3/2010	**Monday**		
		09:00-09:45	**Opening Session:** Head of Quality Assessment System Prof. Yaacov Schul, Vice rector Prof. Oded Navon, Vice rector **(Rector's office, Minhala Bldg. room 408)**
		10:00-10:45	**Meeting with the Dean of the Faculty of Social Sciences, Prof. Avner De-Shalit (Faculty of Social Scie. Room 3719)**
		10:45-11:30	**Meeting with the Department Head, Prof. Moshe Haviv (Faculty of Social Scie. Room 4412)**
		11:30-12:15	**Meeting with the Department Teaching Staff (Faculty of Social Scie Room 4412)** Zvi Gilula — Graduate Student Advisor Yaacov Ritov — Doctorate Student Advisor Samuel Oman — Chairman of the Teaching Committee Uzi Motro — Natural Sciences Coordinator David Zucker
		12:15-13:30	**Lunch with the Department Teaching Staff (Faculty of Social Scie. Room 4412)** Department Head Moshe Haviv, Zvi Gilula, Samuel Oman, Yaacov Ritov, Benjamin Yakir, Moshe Pollack, Uzi Motro, David Zucker, Offer Kella
		13:30-13:45	**Tour of the Department Computer Lab (Faculty of Social Scie. Room 4424)**
		13:45-14:30	**Closed Door Meeting (Faculty of Social Scie. Room 4412)**

16/3/2010 Tuesday

	10:00-11:00	**Meeting with Undergraduate Students (Room 4412)**	
		Daniela Kandel Shlomi Pikali Avital Zigdon	1st Year Students
		Daphna Benjamin Amit Meir Yahel Shiran	2nd Year Students
		Danielle Fogel Efrat Margalit Eran Sandler Lea Tal	3rd Year Students
	11:00-11:45	**Meeting with Junior Staff Members (Room 4412)**	
		Dr. Pavel Chigansky Dr. Gal Elidan Dr. Micha Mandel Dr. Ronit Nirel	
	11:45-12:45	**Meeting with Graduate and Doctorate Students (Room 4412)**	
		Maayan Cherkesski Saar Gershuni Geffen Kleinstern Noam Meir Oshrit Munk Daniel Nevo Jonathan Sidi Aleksander Vainer	Graduate Students
		Sarit Agami David Azriel Hadassa Brunshwig Shmuel Leavitt Asaf Sarig Bella Vakulenko-Lagun	Doctorate Students
	12:45-13:45	**Lunch and Closed Door Meeting (Room 4412)**	
	13:45-14:30	**Meeting with the Department Head, Prof. Moshe Haviv (Room 4412)**	