THE ONGOING EFFECTS OF THE CHANGE IN THE TEACHING LANGUAGE AND ENGINEERING CURRICULUM ON STUDENTS' UNIVERSITY CHOICE CRITERIA

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Abstract ¾ *This paper gives the results of a continuous survey on the engineering students of Istanbul Technical University. The survey is based on the data collected from 16,277 undergraduate students of 8 consecutive years. It tries to evaluate the impact of the reform (introduced in the academic year 1997-1998) consisting of introducing new engineering curricula and 30 % of English as teaching language, on the university choice criteria, the profile and the performance of the students. This continuous survey provides the opportunity to follow the changes (if there is any) in the factors that influence the students' university choice which were job opportunity and good education whereas the most striking one influencing their performance was the education level of their mother. Another interesting result is that foreign language as a teaching language, which was not among their first three choice criteria in the period preceding the reform, gained importance for the new students entering the University after the reform.*

Index Terms ¾ Engineering curriculum reform, English as a teaching language, student profile, university choice criteria.

INTRODUCTION

Reforming the curricula is a challenge for the university administration but also for the faculty members lecturing in the new programs. This is why we conduct such a survey on Istanbul Technical University (ITU) students.

Beginning in the academic year of 1997-98, the curricula of all the engineering programmes and the department of architecture in ITU have been revised, credit hours have been reduced to 150-155 and adapted to the ABET (Accreditation Board for Engineering and Technology) scheme (for the engineering programmes) in order to prepare the accreditation process. This year of radical change included also the introduction of English, as teaching language. Actually 30% of curriculum courses are entirely taught in English, and the rest entirely in Turkish. As we began the survey in 1997-98, we obtained data from students of three years preceding the reform and also from the first year of the revision period with the new entrants responses. Thus the first three years of our research are grouped as the pre-revision period. The last five years form the post-revision one.

The principal aim of the research was to "know", who an ITU student is. Therefore, we conducted a profile research in which we included a part on their reasons of university choice. When we got the first results, in a period of significant transformation in the university, we were interested in extending it to new entrants in order to survey the change of the profile, and also the factors affecting their university choice. This makes this study a continuous survey on entering students and is one of the documents an engineering department heading for accreditation needs to prepare. This is why it constitutes an important support document for the departments who do not have to prepare it themselves.

One of our main problems in designing this survey was the lack of similar research on the subject. Despite considerable research on consumer profiles in marketing or public opinion related work, higher education studies are more concerned with teaching effectiveness and student satisfaction [6], [5], college persistence [1], student performance indicators or judgements [9]. In his article on a model of student college choice, Chapman [2] states that although American universities are within an increasingly intense competition for students, the major part of the research is on factors affecting students' level of educational aspiration and their decision to attend or not attend college. He says that less attention has been given to students' choice of which college to attend.

With studies on higher education being conducted mostly in the United States, one can conclude that the systems of higher education being different in different countries, the interest areas of researchers differ too. Another reason can be that American universities have got into the regular habit of following their student profile a long time ago, and research on this topic presents no real interest for anybody.

However, the situation is quite different not only in Turkey but also in countries where there is no shortage of students but there is shortage of higher education institutions. This is why universities, mostly state-owned and accepting students by an examination process, do not have the need to try to "know" their students better. The studies of Firat [3] in 1996 and Hacettepe University [4], in 1993 can be given as rare examples of student profile in Turkish higher education. Both were conducted on students of state universities. Other studies by Özgüven [7], Tavsancil [11]

and User [12], evaluate the factors affecting student performance. Firat's article also analyses the relationship between profile and performance. But none of those studies include the determinants of university choice, because students are placed in universities according to their results in the entry examination. There is no need to do anything to attract better students, because the system takes care of it. But the competition milieu created with the foundation of private universities changes the situation. With their financial ability to offer high grants and scholarships, they are able to attract the best students. This is why state universities, which were used to getting the best students, are now obliged to find ways to stay attractive. The budget constraints they face, obliges them to find the most effective tools for that purpose.

It is not surprising that such studies do not exist in Turkey where the higher education system is totally different. Although the first aim of this research was to obtain a detailed student profile of ITU, it also gave us the possibility of defining the principal factors influencing their university choice.

METHODOLOGY

The research was conducted on a total of 16,277 undergraduate students, asking them to fill in a questionnaire of 19 questions. 10,261 students, out of 14,518 enrolled, filled in this questionnaire during registration in February 1998. The rate of return was 70.7%. The questionnaire was then included among the forms to be filled by students for registration, and became ITU's official student profile form. This is how we obtained 2,363 questionnaires from the new entrants in September 1998. The rate of return was 100% because this was mailed to them for registration. The results of this survey were presented in IGIP 1999 [8] attracting a high interest from the participants, encouraging the researchers to go on surveying ITU students' profile and university choice criteria. This is how actually the responses of eight consecutive years are collected and a comparison of the pre-revision period (three years) with the post-revision one (five years) is possible.

The last time the questionnaire was filled in on hard copies was during the registration of new entrants in September 1999. As ITU students register on-line since September 2000, the questionnaire was filled in electronically for the last two years new entrants. Unfortunately due to the lack of obligation for filling in, the rate of answer is not 100% and represents a major inconvenience for 2001 entrants. We have only the answers of the students succeeding in the English exam and being exempt of language prep. Although this differentiation creates a problem for comparability of the data, we noticed that it gives us the opportunity of detecting new parameters in student profile and university choice. This is how we decided to analyse separately, beginning from next year, the answers of those who begin directly the engineering studies

without a year of English prep. and those who have to learn English.

The Questionnaire

The questionnaire was prepared in order to obtain the socio-economic profile of students and their university choice criteria.

The questions about the socio-economic profile included:

- the family (size, professional status of parents, education of parents, city, revenue, house, car, domestic appliances, holiday frequency, computer, Internet)
- the student (where he/she lived, his/her revenue, his/her secondary education, frequency of attending cultural events)

Those about university choice were the ranking of the most preferred universities, its reasons and the method of preparing for the entry exam.

The questionnaire was based on the early interviews with undergraduate students about their university choice criteria. This pre-test rendered the possibility to use a close-ended question for the choice criteria.

Methods of Analysis

In the first year of the survey, the questionnaires were processed by optical device and then the responses were collected on ACCESS. All the cross analyses were designed in ACCESS. The results were transferred to Excel for tables and graphics. Beginning from 1998, data collected were directly processed in Excel, using the Pivot Table tool.

RESULTS ABOUT STUDENT PROFILE

The first and major part of the survey is about the student profile and the impact of the new curriculum on it. Those results are given below, under six different groups and in parallel with the structure of the questionnaire.

Student Profile

ITU students mainly graduate from state high schools (around 80% during all the period considered) and this does not vary much among different faculties.

45% of the students come from high schools with a foreign teaching language, mostly English. This rate became 48% in 1998, 46% in 1999 63% in 2000 and 76% in 2001.

Up to 1998, half of ITU students was coming from outside Istanbul, varying between 29% and 72% among the faculties. This situation changed in the last four years, with the rate of ITU students coming from outside rising to around 60%. The most striking increase between the two

periods compared is in the Faculty of Electrical and Electronic Engineering, with an increase rate of 60%, rising from 43% to 69%. The following faculties are Management and Chemical-Metallurgical Engineering.

Up to 2000, 25% of ITU students were used to live in student residence halls, 25% rented an independent flat alone or with a friend, and the rest were living with their families.

There is a striking change in this situation with a rise of students living in residence halls (39% in 2000 and 43% in 2001) and an important decrease of students renting independent flats falling to 17% and 10% in the last two years. The explanation is that, together with the curricular reform in 1997-1998, an important fund raising from the alumni could be realised and mainly used in students' residences as well as laboratories, grants etc. Actually, all students wishing to live in the Campus are placed in the residences and this explains the above mentioned rise.

A great part of ITU students live only with the support of their family. The average of the first 6 years period is 76%. Those who do part-time jobs in addition to family support represent 10% (3% in 2000 and 1% in 2001). 11% of the students had scholarships or student aids from different institutions (16% in 2000 and 7% in 2001) and 3% declared having personal income.

The results of the last two years show a slight increase in the percentage of students living with family support (78% and 90%). Although answers of students entering in 2001 must not be compared on the same basis because they could not yet have enough time to obtain grants and scholarships, the rise from 10% to 16% of students obtaining grants show again the effects of the fund raising from the alumni.

Only one question was asked to have an idea about students' cultural activities (cinema, theatre, concerts etc.). They answered that one fourth participate in those activities once a week or more, one third twice or three times a month, one fifth once a month, and the rest less. The new entrants' answer to this question is quite different however. In 1999 new entrants survey showed that 16% of the new entrants participate in those activities once a week or more, 43% twice or three times a month, one fifth once a month and 19% less. The difference is seen in the first and last frequencies. 2000 and 2001 new entrants answers to that question are quite similar, with 13% and 18% participating to cultural activities once a week or more, 35% and 36 % twice or three times a month, 26% and 33% once a month and 26% and 22% less. This shows that compared to higher education, high school students' participation in cultural activities is less frequent. It can be expected that if the same question is asked to the new entrants in their third or fourth year of university, their frequency to participate to social life would probably be higher.

Family Profile

first three years, those having only one brother or sister represent 50% (53% in 1997, 56% in 1998, 57% in 1999, 54% in 2000 and 62% in 2001). 7% are only children (9% in 1997, 8% in 1998, 8% in 1999, 9% in 2000 and 10% in 2001). 24% have 2 brothers/sisters (22% in 1997, 21% in 1998, 22% in 1999, 20% in 2000 and 21% in 2001). The rest have more. ITU students' families seem to become smaller in the last years, compared to the first one. 2001 important difference in families with two children can be explained by the fact that students who answered to the questionnaire are from families with higher revenues compared to the rest. This reflects on their unwillingness to create big families which is a general phenomena in Turkey. Big families are not rich families but just the opposite, parents thinking to guarantee their future after the retirement, by having lots of children.

Mothers Profile

Up to 1997, 27% of mothers have higher education (31% in 1997, 30% in 1998, 33% in 1999, 30% in 2000 and 41% in 2001). 26% graduated from high school (26% in 1997, 28% in 1998, 26% in 1999, 28% in 2000 and 34% in 2001). Only 4% were illiterate before 1997. Actually, the illiteracy problem is largely resolved in Turkey and this is seen on ITU's students families as well. In 2001 none of the mothers are illiterate (among those who answered). The percentage of mothers with higher education is higher among the students with higher grades in the entry exam. The faculties with the highest rates for all the period are the Faculties of Management, Mechanical Engineering and Architecture.

17% of mothers are employed while 64% do not work (62% in 1997, 57% in 1998, 54% in 1999, 61% in 2000 and 49% in 2001). 17% are retired (16% in 1997, 18% in 1998, 22% in 1999, 19% in 2000 and 21% in 2001).

Among the working mothers, 34% are teachers (36% in 1997, 41% in 1998, 47% in 1999, 47% in 2000 and 37% in 2001). 17% are civil servants (24% in 1997, 20% in 1998 , 18% in 1999, 18% in 2000 and 19% in 2001). 10% are scientific technical professionals such as engineers, lawyers, doctors, etc. (11% in 1997, 10% in 1998, 7% in 1999, 7% in 2000 and 10% in 2001). ITU students' mothers' profession seems to have always been teaching before anything else and with a large difference. This does not change in time.

Fathers Profile

Up to 1997, 51% of the fathers have higher education (54% in 1997, 55% in 1998, 57% in 1999, 56% in 2000 and 73% in 2001), and 18% graduated from high school (18% in 1997, 19% in 1998, 18% in 1999, 29% in 2000 and 20% in 2001). The rate of illiteracy is down to 0% in the last two years.

59% of the fathers are employed (65% in 1997, 66% in 1998, 65% in 1999, 60% in 2000 and 72% in 2001). The rate of fathers not working was 3% during the first period, while it is 4%, 7% and 5% in the last three years.

This increase can be explained by the effect of the actual economic crisis in Turkey. The unemployment increases considerably and it seems to have also affected ITU students' families. 31% are retired (27% in 1997, 25% in 1998 and in 1999). The rest are dead.

The fathers' professions differentiate more than the mothers' do. 13% are civil servants (15% during all the following years) while 13% are scientific technical professionals (12% in 1997, 13% in 1998, 12% in 1999, 10% in 2000 and 13% in 2001). Another 13% are shopkeepers and small sized enterprise owners (12% in 1997, 11% in 1998, 16% in 1999, 14% in 2000 and 11% in 2001). 10% work in temporary jobs (9% in 1997, 9% in 1998, 7% in 1999, 18% in 2000 and 13% in 2001), and 8% are teachers (10% in 1997, 16% in 1998, 14% in 1999, 12% in 2000 and 10% in 2001). The increasing rate of fathers doing temporary jobs is also due to the effect of the economic crisis.

Economic Situation

The general difficulty of getting reliable answers to questions related to family revenue obliged the researchers to ask supplementary questions in order to determine the socio-economic classification of the sample (population in our research). Up to 1998, 70% of the students declared that their family's revenue is in the range of the minimum official wage. This is the reason for the additional questions and the answers are summarised hereafter.

Here, we must explain that this situation seems to have changed in the last years and that the answer to the revenue range is quite reliable from now on. The reason to that is the cancellation risk of the student grants and scholarships if it is found out that student revenue declaration is wrong. This is why in 2000 and 2001, students declaring a minimum official wage represent only 40% and 30% respectively. The difference between the two years have already been explained.

Up to 1997, 72% of families live in their own house/flat (69% in 1997, 71% in 1998, 72% in 1999, 67% in 2000 and 74% in 2001). Almost half of the students' families (45% up to 1997) do not own a car (46% in 1997, 49% in 1998, 47% in 1999, 47% in 2000 and 35% in 2001). 41% have one car (42% in 1997, 47% in 1998, 46% in 1999, 44% in 2000 and 50% in 2001), and the rest more than one.

ITU students' families' holiday habits are as follows: up to 1997 more than half of them travelled once in a year or more (59%). This rate decreased to 58% in 1997 and 50% in 1998. Although there is no equivalent data for the general Turkish population to compare, this diminution can be explained by the impact of worsening general economic conditions. Unfortunately, when the questionnaire was updated by the university administration for the registration of freshmen in September 1999, this question was omitted. This prevented us from seeing if this change continued in the same direction in 1999 but 2000 and 2001 new entrants students were asked to answer to the question. The results reflect the effect of the worsening economic conditions on the families holiday habits. This rate among 2000 students is only 43% whereas it is 56% for the group of 2001 students who answered to the questionnaire and who are from wealthier families.

UNIVERSITY CHOICE OF ITU STUDENTS

The most preferred University of ITU students is Bosphorus University (BU), the second is ITU and the third is Middle Eastern Technical University (METU) (Table 1). Compared to previous years, ITU is less preferred in 1998 with a slight increase in 1999. This can be explained by the fact that ITU is getting students with higher points who prepare their university choice list beginning with institutions with higher entry points. For example, in the ITU Faculty of Management where only students from the top 1800 approx. can enter, ITU is the lowest preference and decreases over time. This is also seen in the Faculties of Electrical and Electronic Engineering and Mechanical Engineering.

In contrast, faculties where ITU is mostly preferred as the first university are those with lower entry points. This shows the problem of university evaluation based only on entrance points in Turkey, where students do not have any other concrete tool to compare the universities such as university ranking in the US or in Great Britain. Another reason is the increase of students coming from outside Istanbul. This can be seen in the increase of METU but not of BU. Among the students coming from outside Istanbul, the most preferred university is still BU, but with a considerable fall to 29%, the second is METU with 25% and the third is ITU with 21%.

TABLE I
THE MOST PREFERRED UNIVERSITIES OF ITU STUDENTS

UNIVERSITY	ITU	BU	METU	BILKENT	OTHERS
1996 and before	33	38	13	6	10
1997	32	37	13	7	11
1998	25	37	18	8	12
1999	26	35	17	5	16
2000	41	20	17	2	20
2001	38	32	17	5	8

The last two years increase in ITU preference can be explained by the change in the university entrance examination system. Up to 2000, students gave their preference list without knowing their results. Beginning from 2000, students make their choice after the exam and they know roughly what they must expect as entering points. This is why their preference list begin from departments where they can expect entering and not from those with highest entering grades.

Choice Criteria of ITU Students

The question about the choice criteria was a closed one. Based on preliminary pilot research, the answers were summarised in order to cover all the possible answers. Then a classification was offered to the students, who had to fill in the first, second and third choice criterion for their most preferred university. The second and the third choice criteria are among the questions, which were omitted by the registration office during the last update, in 1999. This creates a problem of missing data for this year. This is why the interpretation of the choice criteria will not include 1999.

The main university choice criterion of ITU students, regardless of their most preferred university, is the opportunity to get a good education, followed by job opportunities.

TABLE II
MOST PREFERRED UNIVERSITY AND FIRST CHOICE OF ITU STUDENTS

UNIVERSITY	YEAR	0	1	2	3	4	5	6	7	8	9
ITU	-1996	71	2	2	1	1	0	3	2	1	16
	1997	73	2	1	3	1	0	2	0	0	18
	1998	77	1	1	2	0	0	1	1	1	15
	1999	71	1	1	1	1	1	1	1	1	20
	2000	66	4	3	2	0	0	5	3	0	16
	2001	75	3	1	2	0	0	2	1	1	12
BU	-1996	43	10	11	10	0	0	4	2	1	18
	1997	47	9	11	8	0	0	3	2	0	19
	1998	48	6	13	5	0	0	3	3	0	21
	1999	74	0	0	1	0	1	2	2	0	20
	2000	43	11	12	8	0	3	4	1	1	17
	2001	40	15	10	12	0	0	3	2	0	17
METU	-1996	59	7	5	7	0	0	4	2	1	14
	1997	68	6	4	6	0	0	1	2	0	12
	1998	63	3	5	6	2	1	1	2	1	16
	1999	78	1	0	2	0	0	1	2	1	14
	2000	57	9	6	7	0	0	5	1	1	14
	2001	62	3	3	7	1	0	3	2	1	18

0: good education	5: grants
1: social environment	6: image
2: entry points	7: parents' will
3: foreign teaching language	8: friends' advice
4: dormitory	9: job opportunities

This first criterion stays the same for all the three most preferred universities, differing only in percentage, with ITU's being the highest one and increasing in 1998 (Table II). This is followed by job opportunities staying the same for the three most preferred universities, again differing only in percentage, with BU's being the highest one. The highest point as a choice criterion is apparent and exceeds 10% only for BU.

Due to missing answers for 1999, we can not say if this gain of importance of "teaching in a foreign language" continued in the third year of ITU's new curriculum (with 30% of English).

TABLE III
MOST PREFERRED UNIVERSITY AND SECOND CHOICE OF ITU STUDENTS

UNIVERSITY	YEAR	0	1	2	3	4	5	6	7	8	9
ITU	-1996	16	19	3	3	3	1	9	6	6	34
	1997	13	21	2	22	3	1	3	3	3	28
	1998	18	15	1	21	2	1	3	2	2	35
	2000	17	13	6	12	1	2	10	5	3	30
	2001	14	21	2	11	2	1	15	3	4	26
BU	-1996	18	20	7	18	1	1	6	3	2	22
	1997	19	19	5	22	1	1	4	3	2	25
	1998	20	15	6	21	1	1	5	3	2	26
	2000	14	15	9	21	1	1	11	2	2	24
	2001	16	17	6	19	2	1	7	4	2	26
METU	-1996	20	23	5	19	2	1	3	3	3	19
	1997	17	19	8	21	4	0	4	2	3	22
	1998	17	14	2	20	4	2	5	4	2	30
	2000	16	12	7	18	4	2	6	6	1	29
	2001	13	16	10	14	0	3	4	7	4	27

The second choice criterion is the job opportunities and stays the same for all the three most preferred universities, differing only in percentage, with ITU's being the highest one in 1998. The following criterion that was given in the second place is teaching in a foreign language. Especially for ITU, the rise in the frequency of this criterion is quite compatible with the new curriculum where 30% of the courses are in English and it is the result of the status change of ITU.

TABLE IV
MOST PREFERRED UNIVERSITY AND THIRD CHOICE OF ITU STUDENTS

UNIVERSITY	YEAR	0	1	2	3	4	5	6	7	8	9
ITU	-1996	7	20	7	3	2	1	13	10	10	26
	1997	9	15	3	16	2	2	10	8	6	28
	1998	4	27	4	16	2	2	9	8	3	23
	2000	7	14	9	14	3	1	14	6	6	27
	2001	6	18	9	10	1	2	13	8	6	27
BU	-1996	12	24	9	14	1	0	10	4	3	24
	1997	11	19	11	18	1	1	8	3	4	23
	1998	7	24	11	15	3	1	11	4	3	21
	2000	8	18	13	12	1	3	9	5	2	29
	2001	8	21	10	12	1	2	17	3	1	24
METU	-1996	9	18	8	15	3	1	9	4	4	29
	1997	7	23	5	18	2	2	5	3	6	27
	1998	7	24	6	15	5	2	7	6	3	24
	2000	9	20	8	11	5	2	13	4	5	25
	2001	11	24	7	14	2	2	10	7	5	18

The third criterion is the social environment and job opportunities together for all the three most preferred universities. The following criterion is "teaching in a foreign language".

CONCLUSION

This study aimed to evaluate the effects of introducing new curricula in ITU on student profile and their university choice criteria. Although this was the initial aim of the research, we obtained at the same time, an important preparatory document for the accreditation process, which ITU is heading for.

The results of this study show that ITU students mainly graduate from public high schools and half of them come from schools where teaching language is English. ITU has attracted more students from outside Istanbul in recent years. Concerning the introduction of 30% of English as teaching language together with the new curricula, the results show that this had a strong influence on students, because this criterion has a big rise (in percentage) in ITU students' university choice. Most of the students' families have two children. The education level of the parents is very high, compared to the general Turkish population, and this has a strong positive influence on student success. The amount of working mothers increases over time, and they are mostly teachers or civil servants. The fathers' professions differentiate more than the mothers' do.

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