INTERNATIONAL EDUCATIONAL TECHNOLOGY CONFERENCE

# 10th INTERNATIONAL EDUCATIONAL TECHNOLOGY CONFERENCE

## Proceedings Book
## (Volume III)

**Coordinator**
Prof. Dr. Yavuz AKPINAR

**General Coordinator**
Prof. Dr. Aytekin İŞMAN

# Acknowledgement

Dear Guests…

Welcome to the 10th International Educational Technology Conference IETC-2010.

"The International Educational Technology Conference (IETC)" series is an international educational activity for academics, teachers and educators. This conference is now a well known educational technology event and the number of paper submissions and attendees increase every year. It promotes the development and dissemination of theoretical knowledge, conceptual research, and professional knowledge through conference activities, the conference proceeding book, and the Turkish Online Journal of Educational Technology (TOJET). Its focus is to create and disseminate knowledge about the use of instructional technology for learning and teaching in education. This year, IETC-2010 received almost 700 applications. The conference academic advisory board accepted 350 applications.

The first of "The International Educational Technology Symposium (IETS)" and the second of "The International Educational Technology Symposium (IETS)" were held at Sakarya University in Turkey in 2001 and 2002. The third one was at Eastern Mediterranean University in the Turkish Republic of Northern Cyprus in 2003, and the fourth one at Sakarya University in Turkey in 2004. The fifth International Educational Technology Conference (IETC) was organized at Sakarya University in Turkey in 2005.The Sixth International Educational Technology conference was held in Turkish Republic of Northern Cyprus. In 2007, the seventh conference was organized at Near East University in the Turkish Republic of Northern Cyprus. After then The 8th International Educational Technology Conference was held at Anadolu University in Turkey in 2008. The 9th International Educational Technology Conference was organized at Hacettepe University in Turkey in 2009. IETC-2010 conference is organized at Bogazici University in 2010. IETC-2011 will be organized at Istanbul University in 2011.

The International Educational Technology Conference aims to diffuse the knowledge and researches among academicians and lead to development in educational technology and instructional technologies.

Without the authors and participants, IETC-2010 would, of course, have been impossible. We would like to sincerely thank all of you for coming, presenting, and joining in the academic activities. We would also like to thank all of those who contributed to the reviewing process of the "IETC - 2010" conference papers, which will be also published in TOJET. And finally, we would like to thank Sakarya University, Bogazici University, organizing team and The Turkish Online Journal of Educational Technology (TOJET) for successfully organizing and hosting "IETC-2010" in Istanbul, Turkey.

We have lots of participants from 19 different countries. These countries are Algeria, Argentina, Australia, Croatia, Cyprus, Georgia, Greece, Hungary, Iran, Italy, Japan, Lithuania, Malaysia, Netherlands, Nigeria, Portugal, Romania, Serbia, Slovakia, Slovenia, South Korea, Spain, Taiwan, The Former Yugoslav Republic of Macedonia, Turkey, Turkish Republic of Northern Cyprus, United Arab Emirates and United States.

Should you have any enquiries regarding IETC conference, please do not hesitate to contact with us for any additional information you may require.

Finally, we would like to wish you all a pleasant stay in Istanbul-Turkey and safe return back home. I hope that IETC-2010 will be a meeting you will pleasantly remember.

I hope we will meet again at the 11th International Educational Technology Conference - IETC-2011.

Thank you...

Prof. Dr. Aytekin İŞMAN

General Coordinator & Founder of IETC

Editor in Chief of TOJET

April, 26 2010

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## Keynotes

| Date | Time | Topic | Keynote Speaker | Session Chair |
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| 26-04-2010 | 13:00 - 14:00 | Work based learning at Middlesex University | **Prof. Dr. Paul GIBBS** | Hamdi ERKUNT |
| 27-04-2010 | 09:00- 10:00 | Personalized Journal Of Educational Technology In Turkey | **Prof. Dr. H. Ferhan ODABAŞI** | Mehmet GÜROL |
| 27-04-2010 | 13:00 - 14:00 | Building Transparency into Assessment: Technology as an Alignment Tool | **Prof. Dr. Colleen M. SEXTON** | Arif ALTUN |
| 28-04-2010 | 09:00 -10:00 | New Ways of Knowing: Technologies that Support the Shift from Hierarchical to Horizontal, Tacit, and Abductive Knowing | **Prof. Dr. Jerry WILLIS** | Yavuz AKPINAR |

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# SOME RESULTS FROM THE SURVEY ON TURKISH STATISTICS EDUCATION II

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**Abstract**
We tried to investigate some aspects of Turkish statistics education at university level by the valuable supports of TUBITAK (The Scientific and Technological Research Council of Turkey) in 2007-8. Questionnaire forms of students from 19 different statistics departments of Turkish universities were analysed. We also studied on some questionnaire forms of Turkish academic statisticians. In this exposition we intend to share some of the findings on the performance of Turkish education system on statistics. At the end of this paper ,we propose some means which will probably be useful in statistics education.

***Keywords: Some problems of Turkish statistics education , Students' evaluations on Turkish statistics education***

## 1.INTRODUCTION

The discussions on the performance of statistics education were intensified especially at the end of nineteen nineties in United States of America. A review of this process can be found in Bryce (2002).

Minton (1983) , in his article "The Visibility of Statistics as a Discipline" emphasizes that any systematic way of research is called as a " discipline" if it satisfies the following requirements:

**(i)**A theory and body of literature, **(ii)**a significant number of professionals working essentially in the field; **(iii)** more than a few professional journals regularly publishing new advances in the subject, and , **(iv)**a significant market demand for its services.

It is sure that statistics satisfied these requirements totally at the beginning of 20th century. For more than 20 years, ASA (American Statisticians Association) has been organising meetings and symposiums to evaluate the quality of statistics education throughout the world and nowadays there is a vast literature on statistics education .

Despite these facts, many students still view statistics as a difficult topic to learn. Researchers from many fields have emphasized that students and adults still make consistent errors when reasoning about data and chance in real world problems and contexts. ( Garfield & Dani Ben-Zvi, 2007)

Butler (1998) on his study , "On the failure of the widespread use of statistics" shows that although more and more people take introductory statistics courses, these people don't have the skill to use statistical methods in their jobs properly.

## 2. STATISTICAL REASONING, STATISTICAL THINKING AND STATISTICAL LITERACY

These debates on the performance of statistics programs inevitably focus on concepts like statistical reasoning, statistical thinking and statistical literacy. Garfield (2002) defines statistical reasoning as the way people reason with statistical ideas and make sense of statistical information. Rumsey (2002) emphasizes that for the students to be good "statistical citizens" they need a certain level of competence, or understanding of the basic ideas, terms, and language of statistics . Besides, the students are required to be able to explain, decide, judge, evaluate, and make decisions about the information. Snee(1990) describes statistical thinking as the speculated process in which variability is taken into account.

## 3. THE PAST & PRESENT SITUATION OF TURKISH STATISTICS EDUCATION

Statistics is a young discipline in Turkey as far as the establishment years of statistics departments are taken into account. In Turkey , the oldest statistics departments were established in 1960's . Using the figures of 2006, there were 25 statistics departments in which about 4300 students were being educated. For the last 4-5 years, at least 3-5 new statistics departments have been established. In addition, an increasing demand for statistical studies from business life is a fact. On the other hand; as a by-product of this rapid growth process ; there are some serious educational problems that cannot be vanished easily.

## 4.GENERAL FIGURES OF STUDENTS PARTICIPATING THIS SURVEY

This paper discusses some of the results of the project on the evaluation of Turkish statistics education (Yildiz D. et all ,2007) . The project which was supported by TUBİTAK was submitted in 2007. Some aspects and some problems of Turkish statistics education at university level were discussed in Yildiz,D.& Evren A., ( 2008, 2009a and 2009 b ) , in Evren A.& Yildiz (2009) and, Yildiz , N.Ç. et all(2009).

The number of participating students in this survey was 1794. On the average, there were 94 participating students coming from each university . One third of the students in the sample were seniors, whereas one fourth were juniors. 52 percent of the students in the sample were female.

There are two types of education modules or programs offered in Turkey. The first module is carried on days, and the second module is on the evenings. 15.9 % of the students in our sample was from the second module.

## 5. TURKISH STUDENTS' EVALUATIONS ON STATISTICS DEPARTMENTS

The majority of the participating students (65.3 %) of statistics departments thought that the education program was very difficult indeed . 71.5 % of the students needed more rigorous mathematics background to keep up with the courses they were taking. In contradiction with this fact , most of the students did not demand more mathematics courses in their statistics curriculum. On the contrary, most of the students claimed that statistics programs should be enriched by some applied statistics, optimization , computer science and some elective (social and technical) courses. 34 % of the students agreed with the proposition that the textbooks and similar reference books were sufficient both in quantity and in content whereas some other 33 % disagreed. Most of the students in our survey thought that some of the

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theoretical courses offered in their departments were superfluous. 94.9 percent of the students demanded more attention on case studies in some applied courses. 79.7 percent of the students demanded more specialized statistics courses in the program.

### 5.1 SOME EVALUATIONS ON COURSES

We requested the students to list the most useful lectures they had ever taken. Secondly, we categorized most useful statistics core courses according to their contents in the second figure. The following tables summarizes the overall picture:

**TABLE 5.1.1: The percentage distribution of most useful courses from students' point of view.**

| COURSES | PERCENTAGE |
|---|---|
| Statistics core courses | 38 |
| Computer programming and applications | 16 |
| Introductory statistics courses | 15 |
| Mathematics courses | 11 |
| Optimization courses | 8 |
| Other courses | 7 |
| Missing | 5 |

It should be noted that we have seperated introductory statistics courses from other statistics courses to emphasize how important the basics are! Thus it has become possible for us to see a considerable number of students stating the importance of elementary concepts of statistics !

**TABLE 5.1.2: The percentages of most useful courses (within the group of core courses) from students' point of view.**

| COURSES | PERCENTAGE |
|---|---|
| Math. Statistics & Probability | 28 |
| Linear Models | 24 |
| Statistical Decision Making | 18 |
| Sampling Methods& Applications | 14 |
| Multivariate Statistics | 6 |
| Econometrics & Time Series | 5 |
| Nonparametrics | 3 |
| Other | 2 |

The top of the list is occupied by theoretical courses. This was not because most of the students did really like theoretical courses such as probability and mathematical statistics! This was just because all methodology on statistics mostly depended on some theoretic rudiments and the students were really aware of this . The second comment is on nonparametric methods. Only %3 percent found nonparametrics useful. This phenomenon is very interesting because nowadays, nonparametric methodology is gaining more and more strength and popularity among all statistical studies. Rather, this low percentage should be due to incompetencies encountered in courses!

### 5.2 SOME CONCEPTS STUDENTS HAD EXPERIENCED DIFFICULTY IN PERCEPTION

The students stated that they had some difficulty in understanding the following concepts:

1. **Some introductory concepts** : Variance, covariance, standard deviation, correlation, type-I and type-II errors, degree of freedom, hypothesis tests, point and interval estimation.

2. **Some probabilistic concepts and theorems** : The central limit theorems, moment generating functions, sigma algebra, some distributions including chi-square and Snedecor's F distribution .

3. **Some concepts on sampling:** Sampling distributions, standard deviation and standard errors.

These responses were considerably surprising because the problems appeared even at the introductory levels! Besides, as can be predicted a priori , some students declared that they had experienced some difficulty in some abstract notions of probability and mathematical statistics.

## 6. A FACTOR ANALYSIS MODEL

We intended to form a statistical model on the satisfaction scores of students with the departments by a factor-regression model. Among 30 questions, we picked 13 questions (variables) related to students' satisfaction levels. Then we observed that these variables can be reduced to 2 factors by SPSS 11.0 module. These factors can be called as the pedagogical factor and the professional perspective factor.

**TABLE 6.1: Variables in factor model**

| Question code **(Students)** | **Variables (Propositions on Questionnaire forms)** |
|---|---|
| K67 | There are sufficiently large number of consultative services for students within the department. |
| K68 | The personal relations betwen the students and instructors, in general, are satisfactory |
| K69 | The active participations of students in the sessions are maintained strongly |

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| | |
|---|---|
| K70 | The personal relations among the students themselves are satisfactory in general |
| K72 | Behaviours of instructors towards students are friendly and helpful. |
| K74 | There are plenty number of theoretical courses in curriculum. |
| K75 | There are plenty number of applied courses in curriculum |
| K76 | The teaching methods of instructors are both vivid and pedagogic. |
| K77 | The instructors are objective and fair enough in assesing students' performances. |
| K78 | The students are motivated to carry further scientific studies by the instructors. |
| K80 | There are a lot of meetings organized in the department to interact with statistics specialists. |
| K81 | In the department, a lot of meetings or discussions are organized frequently on some other social and cultural issues. |
| K82 | The textbooks and other materials offered for the courses are quite useful. |

**TABLE 6.2 : GROUPING OF VARIABLES UNDER TWO FACTORS**

| Factors | Variables |
|---|---|
| Pedagogy | K67, K68, K70, K72, K74, K76, K77, K78, K69 |
| Professional perspective | K75, K80, K81, K82 |

Here Ys represent the satisfaction level of students with the department in ten different possibilities and X1 and X2 represented pedagogical and professional perspective factors respectively. For this regression-model summarizing statistics are as follows:

**TABLE 6.3: ANOVA TABLE FOR FACTOR REGRESSION MODEL ON STUDENTS' SATISFACTIONS WITH THE DEPARTMENTS**

ANOVA[b]

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 2023,026 | 2 | 1011,513 | 274,860 | ,000[a] |
| | Residual | 6278,264 | 1706 | 3,680 | | |
| | Total | 8301,290 | 1708 | | | |

a. Predictors: (Constant), FAC2_2, FAC1_2

b. Dependent Variable: K109

**TABLE 6.4 : SPSS 11.0 OUTPUT FOR FACTOR REGRESSION MODEL ON STUDENTS' SATISFACTIONS WITH THE DEPARTMENTS**

Coefficients[a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 6,245 | ,046 | | 134,579 | ,000 |
| | FAC1_2 | 1,004 | ,046 | ,455 | 21,624 | ,000 |
| | FAC2_2 | ,420 | ,046 | ,191 | 9,058 | ,000 |

a. Dependent Variable: K109

The two factor regression model for students' satisfaction with the department is

$$Y_S = 6.245 + 1.004\,X_1 + 0.420\,X_2$$

It can be concluded that the satisfaction with the department can be reduced to two factors, namely the pedagogy factor and professional perspective factor for the students. Besides, since the estimate of β1 (pedagogy) is much bigger than that of β2 (professional perspective) , we should emphasize the importance of pedagogical issues related to statistics education!

## 7. DISCUSSION

The efforts on statistics education should necessarily be linked with learning theories of psychology. Kolb(1984) created a model of learning using concrete experience, observation and reflection , forming abstract concepts and testing in new situautions. The circle has described as going from (1) to (4) but one can start anywhere in the cycle which can be viewed as a continuous spiral.

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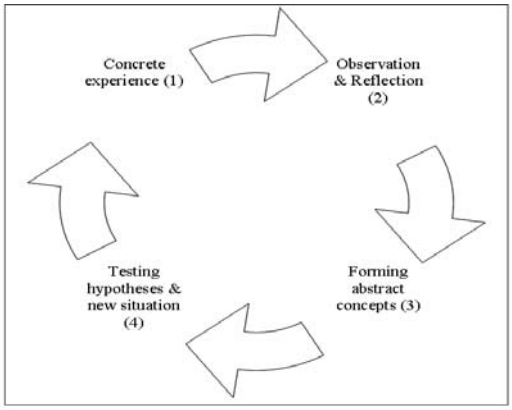



**Figure 7.1 Kolb's Learning Circle**

We will emphasize three issues in this context:

**Learning by manipulating data:** Statistics is an applied science although it has a very abstract and theoretical base. Free time practices are especially vital for the students to "recognize data", and to encounter with some aspects of statistical studies and some basic problems of the processes of collecting , summarizing, analyzing statistical data as well.

**Learning by visual displays**: Students should develop ways of thinking by the help of histograms, charts, graphics.

**Learning by simulations and spreadsheet applications**: "Teachers should consider computing as a tool for learning statistics, not simply for doing statistics. Because graphics and manipulations aid learning, we should encourage students to use software." (Moore, 1997, p. 131)

Some abstract concepts of statistics

( e.g., sampling distributions, central limit theorems) may thus be taught especially by the use of interactive spreadsheet (Ms-Excel or whatever) applications.

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