

# MULTI-CRITERIA ANALYSIS IN STUDENT'S SATISFACTION MEASUREMENT IN HIGHER EDUCATION: THE CASE OF HEALTH CARE MANAGEMENT DEPARTMENT IN THE TECHNOLOGICAL EDUCATIONAL INSTITUTE OF ATHENS

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## **Abstract**

*The measurement of the student's satisfaction from the offered educational task and services in Higher Education, becomes in the current period a necessary tool for the assessment course that all Technological Institutes and Universities should undertake. The measurement and analysis of the student's satisfaction constitutes a significant factor for the improvement of the educational task and the corresponding processes and services given that it provides the departments with remarkable information and results that support their middle term planning and programming for better quality of the educational services.*

*The measurement of the student's satisfaction is obtained with the application of Multi-criteria Satisfaction Analysis. Significant results of the applied methodology are the determination of strong and weak points of the educational services that formulate notable proposals for the improvement of the satisfaction level and the quality of the offered services.*

*Key words: Multicriteria Analysis, Satisfaction Measurement, Quality of Education Services*

## **1. Introduction**

The concept of quality in higher education has received a significant importance recently. Changes brought about by the transition to a knowledge economy have created a demand for higher skills levels in most professions. Consequently countries wishing to move towards the knowledge economy should undertake reforms to raise the quality of their education through changes in content and skills. Education authorities are thus increasingly applying quality assurance and quality control techniques in the management of Universities and academic programs. The need for such an assessment has been also raised by the increasing demand for higher education and the large number of similar academic departments worldwide.

Quality and customer satisfaction are strongly interrelated concepts ( Heskett et al 1994, Roth and Jackson 1995, Oliver and DeSarbo 1989 ) indicating so the great impact that customer satisfaction implies in the quality of the offered services.

In higher education, student's satisfaction plays a positive effect on student's motivation, student's retention and recruiting efforts (Elliot and Shin, 2002).

Patterson et al (1997), Babin and Griffin (1998) have also shown the positive impact of student's satisfaction in minimizing the student's turnover ratio and on the social acknowledgement of the establishment. On the other hand Politis and Siskos (2004), Bouris and Dimas (2009) highlight the effects from the student satisfaction to the department's approach to quality management.

Therefore every educational establishment must adopt an evaluation system for its offered services, so that it can be regularly informed for the degree of its student's satisfaction (Elliot and Shin, 2002).

The aim of this paper is to present a research study on the measurement of student's satisfaction that attend the Health Care Management Department of the Technological Educational Institute of Athens and to show the implications that arise for the improvement of the offered services.

The rest of the paper is organized as follows: section 2 presents the research methodology which comprises the planning of the research and methodological issues, in section 3 the presentation of the results is provided while section 4 summarizes the conclusions and the derived suggestions.

## 2. Research Methodology

### 2.1. Research Planning

The research was conducted in the Technological Educational Institute of Athens for the Health Care Management Department and reflects the satisfaction degree of its students for the spring semester 2008. More specifically the planning of the research was based on the following steps: preliminary analysis, questionnaire development, research conduction, analysis and results.

Preliminary analysis comprises the identification and the settlement of the problem, where the targets of the satisfaction project are clearly determined. The second step comprises the design and the development of the questionnaire as well as the accomplishment of the research. Significant component in this step is the determination of the satisfaction criteria and the measurement scale, that constitute the structure of the questionnaire.

Several criteria have been determined that formed the dimensions of the student's global satisfaction, where each criterion was then analyzed in a number of sub-criteria that captured better the student's satisfaction (table 1). Based on the above dimensions

a simple questionnaire with 31 questions was designed for which a 5-point Likert scale was used (ranged from 'totally agree' to 'totally disagree').

The completion of the questionnaires was obtained by the students during their registration period in all the semesters of the program-study, where the completion time varied from 15 to 20 minutes. 203 questionnaires were completed that correspond to 22% of the active student population of the department.

The internal reliability of the questionnaires was measured with Cronbach's alpha coefficient. The coefficient was estimated to 83% indicating satisfactory levels of internal reliability.

**Table 1: Criteria for Student's Global Satisfaction**

| 1. PROGRAMME STUDY                                                                                                              | 2. ACADEMIC STAFF                                                                                                                                           | 3. TANGIBLES (EQUIPMENT)                                                                                                                                                                                                     | 4. ADMINISTRATIVE SERVICES                                                              | 5. IMAGE – FAME                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| 1.1 Adequacy<br>1.2 Organization<br>1.3 Workload<br>1.4 Profession<br>1.5 Contiguity<br>1.6 Course update<br>1.7 Module variety | 2.1 Friendly behavior<br>2.2 Preparation adequacy<br>2.3 Communication<br>2.4 Education methodology<br>2.5 Objectivity<br>2.6 Informing<br>2.7 Availability | 3.1 Building adequacy<br>3.2 Other facilities<br>3.3 Education material<br>3.4 Labs adequacy<br>3.5 Labs timing<br>3.6 Library Timing<br>3.7 Library's Reading room<br>3.8 Lending Procedures<br>3.9 Library's Electr system | 4.1 Correspondence<br>4.2 Friendly behavior<br>4.3 Clear informing<br>4.4 Service speed | 5.1 Expectations<br>5.2 Recognition<br>5.3 Representation-Promotion<br>5.4 Interdisciplinary |

### 2.2. Methodological Framework

The analysis of the student's satisfaction was obtained with the MUSA method (Multi-criteria Satisfaction Analysis) which constitutes a multi-criteria approach for the measurement of customer satisfaction (Grigoroudis and Siskos, 2002). The method is used for the assessment of global and partial satisfaction functions and  $Y^*$  and  $X_i^*$  respectively, given customers' ordinal judgments  $Y$  and  $X_i$  (for the  $i$ -th criterion). The assumption of an additive utility model is the main principal of the method, and it is represented by the following ordinal regression analysis equation:

$$Y^* = \sum_{i=1}^n b_i X_i^* - \sigma^+ + \sigma^-$$

where  $Y^*$  is the estimation of the global value function,  $n$  is the number of criteria,  $b_i$  is a positive weight of the  $i$ -th criterion,  $\sigma^+$  and  $\sigma^-$  are the overestimation and the underestimation errors, respectively, and the value functions  $Y^*$  and  $X_i^*$  are normalized in the interval  $[0,100]$ .

In this context, the customer satisfaction measurement problem may be formulated as an optimization problem using goal programming techniques.

### 3. Results

The analysis indicates that the Health Care Management Department enjoys a high global satisfaction 83,5% (mean value) while the rest 16,5% of the students claim to be unsatisfied from the quality of services provided by the Department.

In particular the students appear to be fully satisfied with the Image-Fame of the Department and quite satisfied with the Programme Study, Academic Staff and Administrative Services (figure 1), with the exception of Tangibles (Equipment) which amounts to 63,3%.

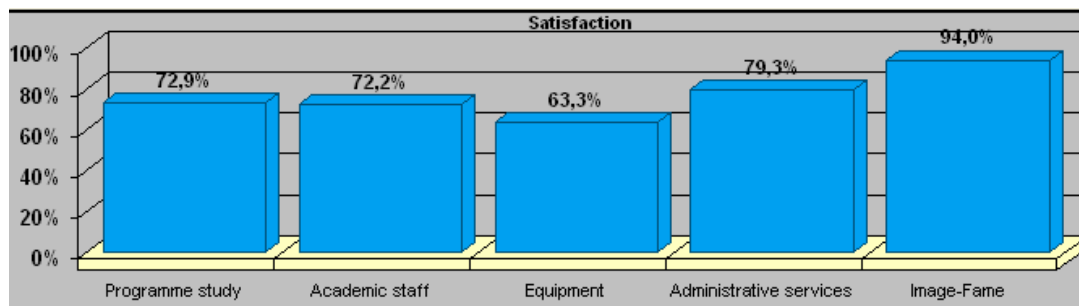


Figure 1: Student's satisfaction in different criteria

The high level of satisfaction for the criterion Image of the Department can be rather attributed to the recognition the Department receives and the competition among similar Departments of other Universities and Technological Institutes.

On the other hand the most significant criterion for the students seems to be the Image-Fame of the Department with a weight factor of 51,1% (figure 2) whereas the rest of the criteria carry much smaller weights, indicating thus the improvement that should be obtained in the performance of those criteria.

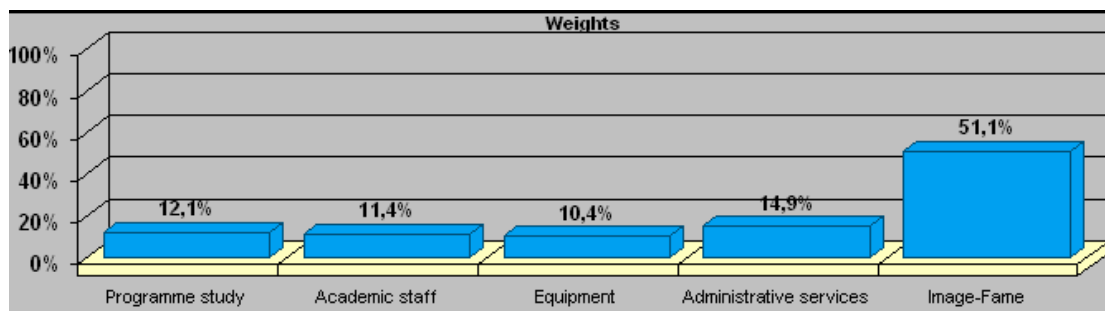


Figure 2: Weight factors for the satisfaction criteria

All five criteria show negative demanding levels (figure 3) implying that students appear to be neutral or non demanding so that the total demanding index is measured to  $-0,60\%$ .

Demanding indexes ( $D$ ) express the average deviation between satisfaction functions and linear value functions with the following interpretation:

Non demanding students ( $D = -1$ ) are those that declare satisfied although their expectations are fulfilled in a low level.

Neutral students ( $D = 0$ ) are the students whose satisfaction increases proportionally to their fulfilled levels of expectations.

Demanding students ( $D = 1$ ) are those students that declare satisfied when they get only the highest level of services.

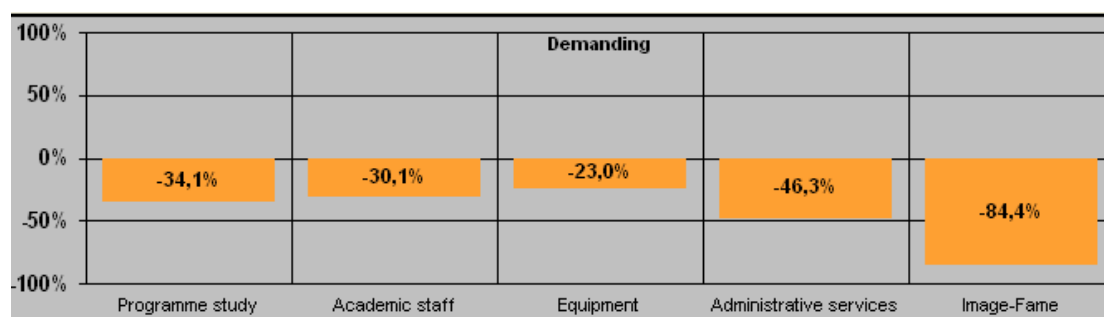


Figure 3: Demanding levels for the satisfaction criteria

Regarding the sub-criteria of each criterion tables 2 and 3 summarizes all the results as far as satisfaction indices, weights and demanding levels are concerned.

Table 2: Sub-criteria indexes

| CRITERIA                   | SATISFAC | WEIGHT | DEMAND |
|----------------------------|----------|--------|--------|
| 1.PROGRAM STUDY            |          |        |        |
| 1.1. Adequacy              | 74,9%    | 0,172  | -0,514 |
| 1.2. Organization          | 75,3%    | 0,167  | -0,520 |
| 1.3. Workload              | 75,2%    | 0,167  | -0,512 |
| 1.4. Profession contiguity | 70,9%    | 0,167  | -0,420 |
| 1.5. Course update         | 75,7%    | 0,167  | -0,520 |
| 1.6. Variety of modules    | 73%      | 0,161  | -0,505 |
| 2.ACADEMIC STAFF           |          |        |        |
| 2.1. Friendly behavior     | 71,7%    | 0,143  | -0,440 |
| 2.2. Preparation adequacy  | 72,3%    | 0,143  | -0,435 |
| 2.3. Communicability       | 75,9%    | 0,158  | -0,497 |
| 2.4. Education methodology | 68,2%    | 0,127  | -0,369 |
| 2.5. Objectivity           | 71,7%    | 0,143  | -0,440 |
| 2.6. Informing             | 72%      | 0,143  | -0,440 |
| 2.7. Availability          | 73,2%    | 0,143  | -0,435 |

With respect to the quality of education perceived by the students, it should be noticed that there is room for improvement in all the sub-criteria of the Program Study and Academic Staff particularly for the sub-criteria 1.4. and 2.4. On the other hand all the sub-criteria for the above two dimensions are equally balanced in importance whereas the students seem to appear neutral and non demanding.

A similar picture arises for the sub-criteria in the other dimensions (table 3) where room for improvement exist for all the sub-criteria. However attention should be given in those of the criterion 'Tangibles' and particularly to 3.3 and 3.9 which they possess the lowest levels of satisfaction. All sub-criteria are equally weighted in their dimensions with exception the 'Recognition' sub-criterion in the Image dimension which seems to be the most important in that dimension. Again the students appear to be neutral in the 'Tangibles' sub-criteria and non demanding in the 'Administrative Services' and 'Image' ones.

Table 3: Sub-criteria indexes (continuation)

| CRITERIA                         | SATISFAC | WEIGHT | DEMAND |
|----------------------------------|----------|--------|--------|
| 3.TANGIBLES                      |          |        |        |
| 3.1. Building adequacy           | 64,8%    | 0,111  | -0,208 |
| 3.2. Other facilities            | 65,8%    | 0,111  | -0,226 |
| 3.3. Education material          | 58,4%    | 0,111  | -0,084 |
| 3.4. Labs adequacy               | 65,6%    | 0,111  | -0,240 |
| 3.5. Labs timing                 | 66,8%    | 0,111  | -0,280 |
| 3.6. Library timing              | 67%      | 0,111  | -0,280 |
| 3.7. Library reading rooms       | 65,9%    | 0,111  | -0,254 |
| 3.8. Lending procedures          | 66,5%    | 0,111  | -0,280 |
| 3.9. Library's electronic system | 57,2%    | 0,111  | -0,080 |
| 4.ADMINISTRATIVE SERVICES        |          |        |        |
| 4.1. Correspondence              | 80,2%    | 0,25   | -0,680 |
| 4.2. Friendly behavior           | 80%      | 0,25   | -0,680 |

| CRITERIA                      | SATISFAC | WEIGHT | DEMAND |
|-------------------------------|----------|--------|--------|
| 4.3. Clear informing          | 80,1%    | 0,25   | -0,680 |
| 4.4. Service speed            | 79,7%    | 0,25   | -0,680 |
| 5.IMAGE-FAME                  |          |        |        |
| 5.1. Expectations             | 92%      | 0,187  | -0,573 |
| 5.2. Recognition              | 96,8%    | 0,226  | -0,645 |
| 5.3. Representation-Promotion | 94,2%    | 0,200  | -0,600 |
| 5.4. Quality                  | 93,4%    | 0,187  | -0,573 |
| 5.5. Interdisciplinary        | 92,4%    | 0,200  | -0,600 |

It should be mentioned though that student's expectations from the department were met to a high level obtaining a satisfaction degree of 92% and also the recognition, quality and promotion amounts for high satisfaction degrees as well. The above results may be combined to an action diagram (figure 4) representing the weak and strong points of the student's satisfaction and indicating the improvements that should be made.

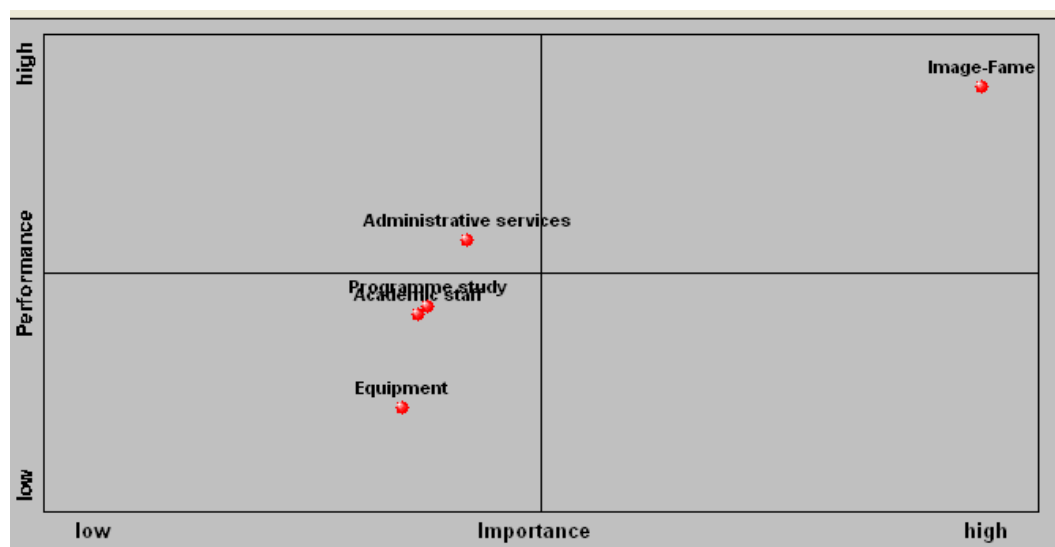


Figure 4: Action diagram for the satisfaction criteria

Action diagrams are designed using the values of the weights and of the satisfaction indices. From figure 4 we observe that the criterion 'Image' with high satisfaction level and weight factor lies in the power area (3<sup>rd</sup> quadrant) and constitutes the comparative advantage of the department since it contributes significantly in the formation of the global student satisfaction. On the other hand three criteria (Program Study, Academic Staff, Equipment –Tangibles) are located in the first quadrant (status quo area) which they present low importance and their satisfaction levels are considered low compared with the mean satisfaction level (83,5). Attention should be given initially in the improvement of the satisfaction performance of those criteria and then in their importance, since the student's behavior changes and therefore the importance of the criteria could be also changed.

#### 4. Conclusions

The increasing competition among universities internationally, due to the spread of technology and the agreements and assessment of the universities, has lead to a furious competition for the students and the academic staff. Satisfaction projects has proven to smoothen the competitive procedure, since they provide the establishments with valuable information regarding the improvement of their educational services.

The current research implies that the quality of education offered at the Health Care Management Department lies at high level. Particularly the basic conclusions are summarized as follows:

- The mean global satisfaction is quite high (83,5%) suggesting though marginal improvements.
- The most important satisfaction dimension and with very high satisfaction degree (94%) is the "Image-Fame" of the department.

The improvement efforts and the suggestions that arise are based on the logic of preserving the satisfaction levels of the strong points while increasing the satisfaction levels of the weak points.

In this respect improvement actions should initiate for the dimension “Tangibles” and all its characteristics since students display the lowest level of satisfaction in that criterion. The policy therefore of the department should be conducted towards that direction in order to improve the quality of its offered services.

However a point that needs investigation is the demanding level of the students that appear to be neutral and non demanding in all the criteria although literature review suggests that students participate actively in the formation and the improvement of the services (Helms and Key, 1994).

A repeated cycle of research is thus recommended to examine those issues and to include other possible factors which affect the satisfaction level of the students.

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