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AN APPLICATION OF THE MULTIVARIATE STATISTICAL ANALYSIS TO SERVICE QUALITY MEASUREMENT IN HIGHER EDUCATION

The conceptualization of service quality and the development of measurement tools and techniques aimed at assessing service quality and customer satisfaction levels within the education sector, have been a central theme of recent years.

The research has examined the student expectations and perceptions of service quality in higher education for tourism and hospitality management, using a modified version of SERVQUAL instrument.

Data were collected using a questionnaire in two parts. The first part is concerned with student perceptions of higher education institutions in general, while the second part is concerned with Faculty of Tourism and Hospitality Management Opatija in particular.

The aim of the present research is the multivariate statistical analysis (factor analysis and reliability analysis) of a SERVQUAL scale adjusted for higher education service quality. The final section of this study is devoted to developing and proposing new directions for future higher education service quality measurement.

Key words: service quality, measurement, SERVQUAL, multivariate statistical analysis, higher education, case study.

1. INTRODUCTION

In today's competitive environment, where all students have many options opened to them, factors that enable education to attract and retain students should be seriously studied. Higher education institutions, which want to have competitive edge in the future, may need to begin searching for new and creative ways to attract, retain and foster stronger relationships with students.

The primary purpose of this study was to examine the applicability of the SERVQUAL instrument in higher education service quality measurement and to determine the relationship between perceptions of academic service quality and institutional quality in a higher education environment. Academic service was defined as service that is not directly related to the classroom activity. This included adaptation of Parasuraman *et al.* (1988) constructs of tangibles, reliability, responsiveness,

assurance and empathy. Various statistical analyses were performed including descriptive statistics, correlation, factor analysis, reliability analysis and t-test.

Results of this study will help researchers and managers to understand the expectations and perceptions of their customers about the quality of services they provide and it will help them make improvements when the results indicate service quality shortfalls.

2. SERVICE QUALITY CONCEPTS IN HOSPITALITY MANAGEMENT EDUCATION

The field of hospitality education is a unique, rather close-knit academic area. The size and scope of the hospitality industry itself has always been difficult to define since few people can agree on what it encompasses. An early definition of hospitality included any and all business and services whose primary objective was serving people outside of a private home.

No matter how the hospitality industry is defined, its constituents generally agree that it is a large, fragmented industry with its own unique set of challenges. These challenges require its managers and workers to be specially trained and/or educated to work effectively in such a customer-driven industry, no matter the segment. Professional preparation for managers and line-level employees alike is available from a variety of venues including government-sponsored work/training programs, trade schools, community colleges, and universities, among others.

Hospitality management education is one segment of the larger hospitality industry. It could be argued that the formal preparation of industry professionals, via hospitality education programs, is the single most important segment.

So what is hospitality education? Carl Riegel (1995) has defined it as *"a field of multidisciplinary study which brings the perspectives of many disciplines, especially those found in the social sciences, to bear on particular areas of application and practice in the hospitality and tourism industry"* [4; 3]. Simply put, it is a field devoted to preparing students, generally, for management positions in hospitality. Hospitality education is finally getting the respect, as a field of study that has deserved for so long.

Higher education, like most business and organizations today, is increasingly concerned about the quality of its goods and services. There is increased competition for a shrinking pool of students and those students (customers) are becoming more sophisticated and demanding. While some organizations make products that are largely tangible, higher education's product is largely intangible. As a result, assurance of quality can be more difficult than in traditional manufacturing industries. Further, unlike tangible goods, the higher education product cannot be returned if the customer is dissatisfied. The money-back guarantee is virtually unheard of. The process of total quality management (TQM) must be goal of higher education, if higher education is to survive in the twenty-first century.

To understand this objective, quality, the term must be defined and discussed. Webster's dictionary defines quality as *"not only the basic character or characteristic that makes something good or bad, commendable or reprehensible, but also the degree of excellence a thing processes, or superiority"* [58; 31]. Webster's goes on to define quality control or assurance as *"a system for maintaining desired standards in a product"* [58; 31]. The two definitions comprise the most simplistic basis for achieving

quality assurance in any organization, including higher education. Obviously an organization must define itself, as through a mission statement and then set goals and objectives that will support that mission before it can hope to measure its outcome against the stated goals. This is quality assurance.

"Quality is everybody's job, part of our job requirements. You cannot create quality without a quality culture in your organization. Change in culture starts from a change in leadership culture and continues only with continuous measurement and feedback" [31; 27].

The global quality assurance movement is increasing business's capacity to survive increased competition. So too, it will be with higher education. In both, customer expectations have been raised. "Quality process management is fast becoming an organizational survival skill" [31; 28]. TQM is a system of delineating, measuring and periodically comparing objectives and outcomes, with the goal of improving organizational work processes, products and services. The purpose is to deliver perceived quality and value to the customer.

University faculty handbooks clearly state that the duties of a faculty member will include teaching, research and service. While teaching and research guidelines and expectations are generally spelled out quite clearly either at the university or faculty levels, service is more open to interpretation and may be more flexible in scope. Service is any activity in which the faculty member offers his or her professional expertise or time to others, either within or outside of the academic community.

To more narrowly define service commitments, the broad category of service can be broken down to internal service and external service. Internal service includes activities directly related to the administration of one's academic unit as well as the greater college and/or university. External service activities include not only providing professional assistance to the community at large, but also participation in professional societies, service on academic and industry boards, and making preparations to groups and associations. In contrast to internal service, though, external service can be even harder to delineate, and as a result, evaluate. Together, these two forms of service represent a very important contribution that faculty members make to their institutions and the external environment.

The service component of a hospitality educator's job plays a critical role in professional development, in a faculty member's level of visibility in an institution and the greater hospitality industry, and contributes significantly to the effectiveness of the various academic units. In recent years, service has been a relatively underappreciated aspect of faculty responsibilities. However, the role of service may finally be getting some of the attention that it has deserved for so long.

Many of the hospitality managers who will be responsible for meeting the challenges of tomorrow are the hospitality management students of today. How well they are prepared to meet these challenges depends on the quality of the current hospitality management curriculum and educators.

3. SERVICE QUALITY: DEFINITION AND MEASUREMENT

DEFINITION: Quality, and in particular quality assessment and assurance procedures, have received much attention in higher education in recent years. Gordon and Partington (1993) described quality of education as: "The success with which an

understand how consumers perceive their services and evaluate service quality (Zeithaml, 1981).

Second, services, especially those with a high labor content, are heterogeneous: their performance often varies from producer to producer, from customer to customer, and from day to day. Consistency of behavior from service personnel (uniform quality) is difficult to ensure (Booms and Bitner, 1981) because what the firm intends to deliver may be entirely different from what the consumer receives.

Third, production and consumption of many services are inseparable (Gronroos, 1978). As a consequence, quality in services is not engineered at the manufacturing plant, then delivered intact to the consumer. In labor intensive services, for example, quality occurs during service delivery, usually in an interaction between the client and the contact person from the service firm (Lehtinen and Lehtinen, 1982). The service firm may also have less managerial control over quality in services where consumer participation is intense because the client affects the process.

Service quality has been discussed in only a handful of researchers (Gronroos, 1982; Lehtinen and Lehtinen, 1982; Lewis and Booms, 1983; Sasser, Olsen and Wyckoff, 1978). Examination of this researchers and other literature on services suggests three underlying themes:

- *Service quality is more difficult for the consumer to evaluate than goods quality.*
- *Service quality perceptions result from a comparison of consumer expectations with actual service performance.*
- *Quality evaluations are not made solely on the outcome of a service; they also involve evaluations of the process of service delivery.*

Researchers and managers of service firms concur that service quality involves a comparison of expectations with performance: *"Service quality is a measure of how well the service level delivered matches customer expectations. Delivering quality service means conforming to customer expectations on a consistent basis."* (Lewis and Booms, 1983)

In line with this thinking, Grönroos (1982) developed a model in which he contends that consumers compare the service they expect with perceptions of the service they receive in evaluating service quality. Grönroos, for example, postulated that two types of service quality exist: *technical quality*, which involves what the customer is actually receiving from the service, and *functional quality*, which involves the manner in which the service delivered [19; 24].

Sasser, Olsen and Wyckoff (1978) discussed three different dimensions of service performance: levels of material, facilities and personnel. Implied in this trichotomy is the notion that service quality involves more than outcome; it also includes the manner in which the service is delivered.

Lehtinen and Lehtinen's (1982) basis premise is that service quality is produced in the interaction between a customer and elements in the service organization. They use three quality dimensions: *physical quality*, which includes the physical aspects of the service, *corporate quality*, which involves the company's image or profile and *interactive quality*, which derives from the interaction between contact personnel and customers as well as between some customers and other customers.

University service has some tangible elements, but what it produces (knowledge) is largely intangible. Higher education can be termed a "pure" service, as

distinguished by the degree of "person-to-person" interaction (Solomon et al., 1985). Viewing higher education (or education in general) as a service (Dotchin and Oakland, 1994; Zimmerman and Enell, 1988) can facilitate generalizing service quality dimensions for this sector. The specific characteristics of any service industry necessitate findings its unique dimensions in addition to the common features with other services. More careful generalization is required to the case of higher education regarding its complex characteristics.

MEASUREMENT: Whilst the service management literature contains much by way of explanation as to why the measurement of service quality is difficult, relatively little work, particularly empirical work, seems to have been carried out to discover how service organizations are overcoming these difficulties.

Lewis (1995) identifies three areas of difficulty in measurement in this area: (1) methodological problems relating to the dimensions, (2) variations in customer expectations and (3) the nature of the measurement tools. The application difficulties themselves stem from two chief resources: (1) the multiplicity of elements included in any analysis of service quality, and (2) the difficulty of administering and adequate research instrument in the field close to the point where the service may be delivered.

There seems little doubt that in the past decade SERVQUAL has proved to be the most popular instrument for measuring service quality. It aims to measure perceptions of service across the five service quality dimensions identified by Parasuraman et al. (1988):

(1)   *Tangibles:* physical facilities and equipment,
(2)   *Reliability:* performing the promised service dependably and accurately,
(3)   *Responsiveness:* provision of a prompt service,
(4)   *Assurance:* customers courtesy, trust and confidence,
(5)   *Empathy:* caring and attention to customers. [48; 14]

Parasuraman et al. (1985; 1988) measured the quality of services provided by the following: retail banks, a long distance telephone company, securities broker, an appliance repair and maintenance firm and credit cards companies [47, 48]. The SERVQUAL scale was produced following procedures recommended for developing valid and reliable measures of marketing constructs (Brown et al., 1993).

The instrument consists of two sets of 22 statements: the first set aims to determine a customer's expectations of a service firm: for example, "They should have up-to-date equipment"; while the second set seeks to ascertain the customer's perceptions of the firm's performance: for example, "XYZ has up-to-date equipment". The respondent is asked to rate his/her expectations and perceptions of performance on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The results of the survey are then used to identify positive and negative gaps in the firm's performance on the five service quality dimensions.

A more recent version of the instrument (Parasuraman et al., 1991) includes a third section that measures the relative importance of the five dimensions to the customer. These scores are then used to weight the perceived service quality measure for each dimension, the main purpose being to give a more accurate overall perceived service quality score.

Based on empirical tests, with the instrument and various theoretical considerations, Parasuraman et al. claim that SERVQUAL is both a reliable and a valid measure of service quality (Parasuraman et al., 1988; 1991; 1993). They also claim that

the instrument is applicable to a wide variety of service contexts (Parasuraman *et al.*, 1988), although it may be necessary to reword and/or augment some of the items.

SERVQUAL instrument has been used in a variety of published studies and there is a growing literature, particularly in the marketing field, critiquing its use. The conceptualization and operationalization of service quality is under heated debate.

Cronin and Taylor (1992) conclude that current performance best reflects a customer's perceptions of service quality and that expectations are not part of this concept [10; 55]. A survey instrument is developed using the same 22 items as the SERVQUAL scale; indeed, Cronin and Taylor (1992) concur with the reliability of Parasuraman *et al.*'s (1991) scale items. A third section is added that measures the importance of each item using a similar set of 22 statements and a seven-point Likert scale. From the results of their empirical investigation Cronin and Taylor (1992) conclude that the unweighted SERVPERF measure (performance only) performs better than any other measure of service quality.

Teas (1993) discusses the conceptual and operational difficulties of using the performance-minus expectations approach, with a particular emphasis on expectations. He proposed and empirically tested two alternative perceived service quality models, evaluated performance and normed quality. He concluded that the evaluated performance model outperforms SERVQUAL and the normed quality model. In this model service quality is measured by the gap between perceived performance and the ideal amount of a feature, rather than the customer's expectations.

A number of others also enter the debate on service quality measurement, for instance, Babakus and Boller (1992), Boulding *et al.* (1993), Bolton and Drew (1991), Brown *et al.* (1993), Buttle (1996), Carman (1990), Genestre and Herbig (1996), Iacobucci (1996), Lam and Woo (1997), Lewis and Mitchell (1990), Mels *et al.* (1997) and Smith (1995). In return, Parasuraman *et al.* defend their approach while also making changes to the SERVQUAL instrument in response to the criticisms and additional empirical research. What is apparent is that the debate over how best to measure service quality is far from complete.

Several researchers have attempted to apply the SERVQUAL instrument in tourism and hospitality research (Bojanic and Rosen, 1994; Getty and Thompson, 1994; Saleh and Ryan, 1991; Ingram and Daskalakis, 1999; Oh, 1999; Luk, 1997; Bigne *et al.*, 2001, Howat *et al.*, 1999; Lentell, 2000). Most of these researchers have applied the SERVQUAL instrument as modified for hospitality situations and found results different from those of the original SERVQUAL researchers. For example, Bojanic and Rosen (1994) identified six factors, compared to the original five factors, underlying restaurant customer's expectations and perceived performance levels. Similarly, Saleh and Ryan (1991) arrived at different factor dimensions for lodging services. Meanwhile, by supporting performance-only measures for lodging services, Getty and Thompson (1994) attempted to develop a scale, which they called LODGQUAL, for the lodging industry.

Despite the above applications and propositions, caution should be taken when interpreting the results of these studies. First, Bojanic and Rosen (1994) used the same factor structure for both expectation and performance, but it is not likely that the factor patterns for the two constructs are identical in real situations. Typically, the performance construct is likely to produce a smaller number of factors than expectations. This is the case because customer's perceptions of actual service delivery tend to be narrower than their expectations due to likely limited exposure to actual

service performances. Customer's expectations are likely to be generic and therefore do not limit perceptual variation.

A second reason to exercise caution in interpreting current hospitality studies relates to the level of abstraction in the factor analyses. For example, Parasuraman *et al.* 1988, repeated factor analysis to reduce the sizable data set to a reliable factor structure. This data reduction increased proportionately the level of abstraction in the interpretation of their results. Thus, the factor structure could be somewhat tentative unless the level of abstraction is controlled. It is unlikely that the findings of Bojanic and Rosen (1994) and Saleh and Ryan (1991) could be directly compared to those of Parasuraman *et al.*, because the latter researchers used different attributes with different levels of abstraction under different settings. In particular, Bojanic and Rosen's (1994) inference about the dimensionality of service quality is questionable, because they obtained the performance-expectations difference scores based on factor structure rather than item levels (Parasuraman *et al.*, 1988).

Viewing higher education (or education in general) as a service (Dotchin and Oakland, 1994; Zimmerman and Enell, 1988) can facilitate generalizing service quality dimensions for this sector. However, the specific characteristics of any service industry necessitate findings its unique dimensions in addition to the common features with other services. More careful generalization is required for the case of higher education regarding its complex characteristics.

McElwee and Redman (1993) used a model of service quality dimensions (SERVQUAL) developed by Parasuraman *et al.* (1985, 1988) as a basis for an adapted model for higher education. In view of the framework structure of SERVQUAL, their main emphasis was placed on functional (interactive) aspects of quality. Hill (1995) also investigated the implications of service quality theory for higher education. In another study, Anderson (1995) used SERVQUAL to evaluate the quality of an administrative section in a university (office of student service). Rigotti and Pitt (1992) to evaluate an MBA program successfully used a version of the SERVQUAL instrument.

It was decided that a modified version of the SERVQUAL instrument should be tested on current students and an evaluation should be prepared. Unfortunately, this questionnaire reduces the original ten constructs to five, but it was felt that this would not be a serious disadvantage.

The use of a measure of service quality that is the difference between expectations and perceptions was seen as a better way to measure satisfaction or dissatisfaction with the course experience. The students who form the population for this case study have already had experience of higher education. Thus it was felt that they would base their expectations on this experience and so the service quality scores should provide a guide as to whether students see the quality of their experience declining or improving.

4. CASE STUDY: A *SERVQUAL* APPLICATION

Data and methodology

The primary purpose of this study was to examine the application of the SERVQUAL instrument (Parasuraman *et al.*1988) in the measurement of service quality provided by Faculty of Tourism and Hospitality Management Opatija (FTHM).

A survey (N = 410) examined the measurement of respondent's expectations and perceptions of service quality. Participants were asked to rate statements that would measure their expectations of the services provided by an ideal service organization. Then they were asked to rate another set of statements that would measure their perception of the actual services delivered to them by FTHM.

Five dimensions of service quality were assessed, each represented by a research question (see Appendix): (1) tangibles (such as the appearance of the physical infrastructure), (2) reliability (such as an employee's ability to perform promised services), (3) responsiveness (such as the willingness of support personnel to help students), (4) assurance (such as support personnel's ability to convey trust and confidence) and (5) empathy (such as the provision of caring and individualized attention given to students). The survey instrument consisted of three sections: (1) item focused on student expectations of higher education institutions in general, (2) item focused on student perceptions of service quality at FTHM, and (3) demographic variables (mode of study, year of study, gender, lectures attended).

In order to minimize the impact on the reliability, the changes to the wording were reduced to the minimum necessary to provide the appropriate context. By way of an example of the changes made, the original question QE12 and the revised version are show below:

- *Their employees do not always have to be willing to help customers.*
- *University employees do not always have to be willing to help students.*

A totally new instruction page was prepared and a five-point Likert scale adopted rather than the seven-point scale used originally. The scale was arranged so that strongly agree was coded as five, while strongly disagree was coded as one. Each question was associated with the number one to five and to complete their answers users were asked to circle the number that best matched their opinion.

Service quality surveys were conducted in academic year 2001/2002 with all year graduate students at the end of winter semester. Student were given verbal and written instructions, and completed the questionnaires during the first few minutes of class. The respondents remained totally anonymous. Of the 500 students surveyed for this study, 410 returned usable questionnaires giving a response rate of 82 per cent. The are high response rates, but the design of the study, using students who could be easily contacted, facilitated a high response. The Statistical Package for the Social Science (SPSS), version 10.0 was used to analyze the data.

Additional variables were created to re-code the negatively scored questions to the equivalent positive code. The means scores were calculated and compared with the questions to see if any of the responses supported information, which has been gathered, about the respondents by other, less formal, means. Various statistical analyses were performed including descriptive statistics, correlation, reliability analysis, factor analysis and t-test. The variables were tested for reliability by calculation of their alpha coefficients. Factor analysis of the variables was then carried out using varimax rotation. Further factor analysis was carried out on the scores for the expectations and perceptions questions separately.

Empirical findings

A convenience sample of 410 graduate students of a Faculty of Tourism and Hospitality Management Opatija, comprising 26.6 per cent male and 73.4 per cent female respondents. Within the sample there were 174 students (42.4 per cent) from first year, 138 (33.7 per cent) from second year, 22 (5.4 per cent) from third year and 76 students (18.5 per cent) from the final year. The profile of the sample is shown in TABLE I.

TABLE II displays means, mode and standard deviation for student expectations and perceptions by dimensions and by questionnaire items. The results suggest that students expect a very high level of support from faculty staff but are more divided over what happens in practice. These questions also illustrate the problem of negative-sounding questions as opposed to those questions that specifically require reverse scoring. This kind of problem raises the issue of whether the revised questions should have departed more widely from the original text.

The SERVQUAL scale was subjected to a reliability analysis to assess the quality of a measure. Reliability analysis studies the properties of measurement scales and the item that make them up. The reliability analysis procedure calculates a number of commonly used measures of scale reliability and also provides information about the relationship between individual items in the scale. The doubts about the suitability of the question wording were increased by the results for alpha coefficients. Cronbach alpha is a model of internal consistency, based on the average inter-item correlation.

From TABLE III it become clear that *alpha coefficients* for all dimensions is lower than those reported by Parasuraman *et al.* in 1988. These results are also lower than those in any of the other replication studies that Parasuraman *et al.* reviewed in their reassessment of the SERVQUAL scale in 1991. For expectation score tangibles (0.57) is the most important dimension, closely followed by assurance (0.54) and empathy (0.54), and responsiveness is the least important, with reliability the next least important. By perception score assurance (0.69) is the most important dimension and empathy is the last important dimension (0.46). The Cronbach alpha for expectation is 0.66, and for perception 0.80. On the basis of results it could be argued that the version of the questionnaire used in this study should be considered reliable.

Table IV shows the *SERVQUAL score* (perceptions - expectations). Tangibles, reliability and assurance gaps are negative, indicating perceptions fell short of expectations. Responsiveness and empathy gaps are positive. Tangibles exhibit the largest gap (-1.21) and empathy the smallest (0.13).

TABLE V and TABLE VI presents the results obtained using *factor analysis*. Factor analysis was conducted in order to gain a better understanding of the underlying structure of the data. A principal components factor analysis, using varimax rotation, was carried out on the total sample. It yielded 8 factors of higher education student expectations of service quality, which accounts for 60.355 per cent of the variation in the data, and 6 factors of student perceptions, which accounts for 55.378 per cent. It should be noted that the factors recovered here do not correspond with those recovered in the early SERVQUAL studies, where there were five factors - responsiveness, reliability, empathy, assurance and tangibles - which were said to represent the generic dimensions of service quality (Parasuraman *et al.*, 1991). However, many subsequent studies of service quality in a variety of services have also failed to recover the five dimensions of service quality (Butle, 1996).

The mean differences (t-test) in TABLE VII are statistically significant.

Discussion

The application of the 1988 version of SERVQUAL has been subjected to a number of theoretical and operational criticisms as following:

(1) *Theoretical:*
- Paradigmatic objections: SERVQUAL is based on a disconfirmation paradigm rather than an attitudinal paradigm; and SERVQUAL fails to draw on established economic, statistical and psychological theory.
- Gaps model: there is little evidence that customers assess service quality in terms of perception - expectation gaps.
- Process orientation: SERVQUAL focuses on the process of service delivery, not the outcomes of the service encounter.
- Dimensionality: SERVQUAL's five dimensions are not universals; the number of dimensions comprising service quality is contextualized; items do not always load on to the factors which one would a priori expect; and there is a high degree of inter-correlation between the five RATER dimensions.

(2) *Operational:*
- Expectations: the term expectation is polysemic; consumers use standards other than expectations to evaluate service quality; and SERVQUAL fails to measure absolute service quality expectations.
- Item composition: four or five items can not capture the variability within each service quality dimension.
- Moment of truth: customers' assessments of service quality may vary from moment of truth to moment of truth.
- Polarity: the reversed polarity of items in the scale causes respondent error.
- Scale points: the seven-point Likert scale is flawed.
- Two administrations: two administrations of the instrument cause boredom and confusion.
- Variance extracted: the over SERVQUAL score accounts for a disappointing proportion of item variances.

All these theoretical and operational criticisms can also be applied in this case study.

5. CONCLUSION

This review was conducted to provide service quality researchers with more useful guidelines for future research that would result in more rigorous theoretical and methodological progresses.

The service quality measurement in higher education debate is: a summary of areas of disagreement suggests a number of areas for consideration. *First*, whether course managers are primarily interested in measuring service quality in higher education for predictive or diagnostic purposes. *Second*, the nature of service quality is of prime importance and as yet is unresolved. *Third*, the relevance of expectations and importance in service quality measurement in higher education should be determined. *Fourth*, the dimensionality of service quality needs to be better understood. *Fifth*, should student expectations be relevant to service quality, which form(s) of

expectations are relevant? *Finally,* of the various formats that have been suggested for measuring service quality, which is the most reliable and valid for higher education? Indeed, what other approaches could be adopted? This may again depend on the service context and the purpose of the measurement instrument.

Following a decade of measurement with SERVQUAL, is it possible to be followed by another decade? The answer is probably negative. Perhaps it is time to recognize that SERVQUAL has been just one contribution, although an important one, in the evolution of understanding of service quality and its measurement. It is hoped that this article has offered a useful starting-point for such research.

REFERENCES

5. Anderson, E. (1995), "High tech v. high touch: a case study of TQM implementation in higher education", Managing Service Quality, 5, 2, 48-56
6. Asubonteng, P., McCleary, K. J., Swan, J. E., (1996), "SERVQUAL revisited: a critical review of service quality", Journal of Service Marketing, 10, 6, 62-81
7. Athiyaman, A., (1997), "Linking student satisfaction and service quality perceptions: the case of university education", European Journal of Marketing, 31, 7, 528-540
8. Barrows, C. W., Bosselman, R. H. (1999), Hospitality Management Education, New York: The Haworth Hospitality Press
9. Bigne, E., Sanchez, I., Sanchez, J., "Tourism image, evaluation variables and after purchase bahaviour: inter-relationship", Tourism Management, Vol. 22, 2001, 607-616
10. Bojanic, D. D., Rosen, L. D. (1994), "Measuring service quality in restaurants: AN application of the SERVQUAL instrument", Hospitality research journal, 18, 1, 3-14
11. Brown, T. J., Churchill, G. A. Jr., Peter, J. P. (1993), "Improving the measurement of service quality", Journal of Retailing 69, 127-139
12. Brown, T., J., Churchill, G. A., Peter, J. P. (1993), "Research note improving the measurement of service quality", Journal of Retailing, 69, 1, 126-139
13. Buttle, F., (1996), "SERVQUAL: review, critique, research agenda", European Journal of Marketing, 30, 1
14. Carman, J. M. (1990), "Consumer perceptions of service quality: an assessment of the SERVQUAL dimensions", Journal of Retailing 60 (Spring), 33-55
15. Cronin, J. J. Jr., Taylor, S. A. (1992) "Measuring service quality: A reexamination and extension", Journal of Marketing 56, 55-68
16. Cuthbert, P. F., (1996), "Managing service quality in HE: is SERVQUAL the answer? Part 1", Managing Service Quality, 6, 2, 11-16
17. Cuthbert, P. F., (1996), "Managing service quality in HE: is SERVQUAL the answer? Part 2", Managing Service Quality, 6, 3, 31-35
18. Dale, C., Robinson, N., (2001), "The theming of tourism education: a three-domain approach", International Journal of Contemporary Hospitality Management, 13, 1, 30-35
19. Davies, B., Baron, S., Gear, T., Read M., (1999), "Measuring and managing service quality", Marketing Intelligence & Planning, 17, 1, 33-40
20. Doherty, G. D., (1997), "Quality, standards, the consumer paradigm and development in higher education", Quality Assurance ih Education, 5, 4, 239-248
21. Dotchin, J. A., Oakland, J. S. (1994), "Total quality management in services - Part 1: Understanding and classifying services", International Journal of Quality and Reliability Management, 11, 3, 9-43
22. Dotchin, J. A., Oakland, J. S., (1994), "Total Quality Management in Services: Part 3 – Distinguishing Perceptions of Service Quality", International Journal of Quality & Reliability Management, 11, 4, 6-28
23. Ferguson, G. A. (1988), Statistical Analysis in Psychology and Education, New York: McGraw-Hill Book Company
24. Garavan, T. N., Murphy, C., (2001), "The co-operative education process and organizational socialization: a qualitative study of student perceptions of its effectiveness", Education + Training, 43, 6, 281-302
25. Getty, J. M., Thompson, K. N. (1994), "A procedure for scaling perceptions of lodging quality", Journal of Marketing Research, 18, 2, 75-96

26. Gordon, G., (1995), "Higher Education 2005: pointers, possibilities, pitfalls, principles", Quality Assurance in Education, 3, 4, 21-29

27. Grönroos, C. (1984), "A service quality model and its marketing implications", European Journal of Marketing 18/4, 36-44

28. Gronroos, C., (1991), "Scandinavian Management and Nordic School of Services – Contribution to Service Management and Quality", International Journal of Service Industry Management, 4, 3, 17-25

29. Gummesson, E., (1991), "Truths and Myths in Service Quality", International Journal of Service Industry Management, 2, 3, 7-16

30. Hill, F. (1995), "Managing service quality in higher education: the role of the student as primary consumer", Quality Assurance in Education, 3, 3, 10-21

31. Ho, S. K., Wearn, K., (1996), "A higher education TQM excellence model: HETQMEX", Quality Assurance ih Education, 4, 2, 35-42

32. Holmes, G., McElwe, G., (1995), "Total quality management in higher education", The TQM Magazine, 7, 6, 5-10

33. Ingram, H., Daskalakis, G., "Measuring quality gaps in hotels: the case of Crete", *International Journal of Contemporary Hospitality Management,* Vol. 11, 1999, 24-30

34. Johnson, F. C., Golomskus, A. J., (1999), "Quality concepts in education", The TQM Magazine, 11, 6, 467-473

35. Johnson, R. L., Tsiros, M., Lancioni, R. A., (1995), "Measuring service quality: a systems approach", Journal of Service Marketing, 9, 5, 6-19

36. Lawrence, J. L., McCollough, M. A., (2001), "A conceptual framework for guaranteeing higher education", Quality Assurance in Education, 9, 3, 139-152

37. Lickson, J. E., Kauppinen, T.J., Ogg, A. J. (1994), "Quality management: The multidimensional leadership challenge", Hospitality and Tourism Educator, 8, 27-32

38. Lockwood, A., (1995), "Applying service quality concepts to hospitality education", Education + Training, 37, 4

39. Lomas, L., (1999), "The culture and quality of higher education institutions: examining the links", Quality Assurance ih Education, 7, 1, 30-34

40. Lomas, L., Tomlinson, K., (2000), "Standards: the varying perceptions of senior staff in higher education institutions", Quality Assurance in Education, 8, 3, 131-139

41. Luk, S. T. K., "An examination of the role of marketing culture in service quality", *International Journal of Contemporary Hospitality Management,* Vol. 9, 1997, 3-21

42. McAdam, R., Welsh, W., (2000), "A critical review of the business excellence quality model applied to further education colleges", Quality Assurance in Education, 8, 3, 120-130

43. McDougall, G. H. G., Levesque, T., (2000), "Customer satisfaction with services: putting perceived value into the equation", Journal of Service Marketing, 14, 5, 392-410

44. McElwee, G., Redman, T. (1993), "Upward appraisal in practice", Educational and Trainig, 35, 2, 27-31

45. McElwee, G., Scott, J., (2000), "Planning for a successful teaching quality assessment exercise in business and management: a case study", Quality Assurance in Education, 8, 3, 147-151

46. McMillan, J. H., Schumacher, S. (1997), Research in Education, New York: Longman

47. Oakland, J. S. (1993), Total Quality Management, Oxford: Professional Publications

48. Oldfield, B. M., Baron, S., "Student perceptions of service quality in a UK university business and management quality", Quality Assurance ih Education, Vol. 8, No. 2, 2000, pp. 85-95

49. Owlia, M. S., Aspinwall, E. M., (1996), "A framework for the dimensions of quality in higher education", Quality Assurance in Education", 4, 2, 12-20

50. Owlia, M. S., Aspinwall, E. M., (1997), "TQM in higher education – a review", International Journal of Quality & Reliability Management, 14, 5, 527-543

51. Parasuraman, A., Zeithaml, V. A., Berry, L. L (1985), "A conceptual model of service quality and its implication for future research", Journal of Marketing 49, 41-50

52. Parasuraman, A., Zeithaml, V. A., Berry, L. L. (1988), "SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality", Journal of Retailing 64, 12-40

53. Parasuraman, A., Zeithaml, V. A., Berry, L. L. (1991), "Refinement and reassessment of the SERVQUAL scale", Journal of Retailing 67, 420-450

54. Parasuraman, A., Zeithaml, V. A., Berry, L. L. (1994), "Reassessment of Expectations as a Comparison Standards in Measuring Service Quality: Implications for Further Research", Journal of Marketing 58 (January), 111-124

55. Pearson, C. A. L., (1997), "Achieving customer service quality through teamwork: The Murdoch University case", Empowerment in Organisations, 5, 2, 96-112

56. Pounder, J., (1999), "Institutional performance in higher education: is quality a relevant concept?, Quality Assurance in Education, 7, 3, 156-165
57. Robinson, S., (1999), "Measuring service quality: current thinking and future requirements", Marketing Intelligence & Planning, 17, 1, 21-32
58. Robledo, M. A., (2001), "Measuring and managing service quality: integrating customer expectations", Managing Service Quality, 11, 1, 22-31
59. Rowley, J., "Motivation and academic staff in higher education", Quality Assurance in Education, Vol. 4, No. 3, 1996, pp. 12
60. Teas, R. K. (1993), "Expectations, performance evaluation and consumers' perceptions of quality", Journal of Marketing, 57, 18-34
61. Thomas, R., Harris, V., (2000), "Teaching quality and staff research: are there connections? A case study of a metropolitan university department", Quality Assurance in Education, 8, 3, 2000,139-147
62. Webster's dictionary
63. White, S., (2000), "Quality assurance and learning technologies: intersecting agendas in UK higher education", Quality Assurance in Education, 8, 1, 7-16
64. Yorke, M., (1999), "Assuring quality and standards in globalised higher education", Quality Assurance in Education, 7, 1, 14-24
65. Zeithaml, V. A., Parasuraman, A., Berry, L. L. (1990), Delivering Quality Service: Balancing Customer Perceptions and Expectations, New York: The Free Press.

TABLE I.   Student respondent profile *(N=410)*

Description	Number of respondent	
	Frequencies	Percent
Mode of Study:		
Full-time graduate student	388	94,6
Part-time graduate student	22	5,4
	410	**100**
Year of Study:		
Year 1	174	42,4
Year 2	138	33,7
Year 3	22	5,4
Year 4	76	18,5
	410	**100**
Gender:		
Male	109	26,6
Female	301	73,4
	410	**100**
Lectures attended:		
> 75%	246	60,0
50 - 75%	138	33,7
25-50%	19	4,6
< 25%	7	1,7
	410	**100**

Source: *Author*

TABLE II.   **Average scores for expectations and perceptions (this study)**

Dimensions	Question no. (PBZ)	Question no. (this study)	EXPECTED SQ			PERCEIVED SQ		
			Mean	Mode	St. dev	Mean	Mode	St. dev
Tangibles	V1	V1	4.81	5	0.50	3.01	4	1.09
	V2	V2	4.08	4	0.90	2.87	2	1.15
	V3	V3	4.09	5	0.91	3.89	4	0.88
	V4	V4	4.43	5	0.79	2.79	2	1.17
		Mean	*4.35*			*3.14*	*3.14*	
Reliability	V5	V5	4.84	5	0.50	2.62	2	1.23
	V6	V6	4.79	5	0.55	2.16	2	0.91
	V7	V7	4.72	5	0.60	2.61	3	1.01
	V8	V8	4.35	5	0.95	3.03	4	1.25
	V9	V9	4.76	5	0.63	3.29	3	0.96
		Mean	*4.69*			*3.70*		
Responsiveness	V10 (-)	V10(-)	3.24	4	1.30	4.02	5	3.61
	V11(-)	V11(-)	2.66	3	1.10	3.47	3	1.03
	V12(-)	V12(-)	1.97	1	1.20	3.72	4	1.14
	V13(-)	V13(-)	1.93	1	1.17	3.44	4	1.24
		Mean	*2,45*			*3.66*		
Assurance	V14	V14	4.42	5	0.87	2.69	3	1.04
	V15	V15	4.56	5	0.74	2.71	3	1.03
	V16	V16	4.80	5	0.58	2.74	2	1.17
	V17	V17	4.57	5	0.70	3.03	3	0.91
		Mean	*4.59*			*2.79*		
Empathy	V18(-)	V18(-)	3.08	4	1.27	3.69	4	1.20
	V19(-)	V19(-)	4.90	5	0.35	3.10	4	1.25
	V20(-)	V20(-)	3.40	4	1.18	4.01	5	2.61
	V21(-)	V21(-)	3.17	4	1.30	3.35	3	1.14
	V22(-)	V22(-)	2.69	2	1.27	3.76	4	1.09
		Mean	*3.45*			*3.58*		

Source: *Author*

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TABLE III.   **Alpha coefficient for PBZ and this study**

Dimensions	Question no. (PBZ)	Question no. (this study)	Alpha (PBZ)	Alpha EXPECTED (this study)	Alpha PERCEIVED (this study)
Tangibles	V1	V1	0.72	0.57	0.59
	V2	V2			
	V3	V3			
	V4	V4			
Reliability	V5	V5	0.83	0.50	0.66
	V6	V6			
	V7	V7			
	V8	V8			
	V9	V9			
Responsiveness					
	V10(-)	V10(-)	0.82	0.49	0.58
	V11(-)	V11(-)			
	V12(-)	V12(-)			
	V13(-)	V13(-)			
Assurance	V14	V14	0.81	0.54	0.69
	V15	V15			
	V16	V16			
	V17	V17			
Empathy					
	V18(-)	V18(-)	0.86	0.54	0.46
	V19(-)	V19(-)			
	V20(-)	V20(-)			
	V21(-)	V21(-)			
	V22(-)	V22(-)			

Source: *Author*

TABLE IV.   **Student's expectations and perceptions of service quality**

Dimensions	Expectations	Perceptions	SERVQUAL score = Perceptions - Expectations
Tangibles	4.35	3.14	-1.21
Reliability	4.69	3.70	-0.99
Responsiveness	2.45	3.66	1.21
Assurance	4.59	2.79	-1.8
Empathy	3.45	3.58	0.13
Total score	*3.91*	*3.37*	*-0.54*

Source: Author

TABLE V. **Factor derived from this study - Component Matrix(a) –**
EXPECTED SQ

	Component							
	1	2	3	4	5	6	7	8
QA19	,625							
QA15	,587							
QA7	,569							
QA1	,558							
QA16	,540							
QA9	,536							
QA5	,497							
RQA12	,462							
RQA20		,646						
RQA18		,595						
RQA11		,580						
RQA21		,540						
RQA10		,537						
RQA22		,461						
QA2			,547					
QA4			,484					
QA3			,461					
QA6				,512				
QA14					,581			
RQA13					-,459			
QA17						,610		
QA8							,584	
Extraction Method: Principal Component Analysis.								
a 8 components extracted.								

Source: Author

TABLE VI.   **Factor derived from this study – Rotated Component Matrix(a) - PERCEIVED SQ**

	Component					
	1	**2**	**3**	**4**	**5**	**6**
RQAD12	,713					
RQDA20	,698					
RQAD11	,666					
RQDA22	,643					
RQAD10	,593					
QDA15		,694				
QDA14		,684				
QDA16		,645				
QAD6		,567				
RQDA13		,440				
QAD5			,717			
QAD8			,680			
QDA19			,588			
QAD7			,529			
QAD2				,789		
QAD1				,710		
QAD4				,666		
RQDA21					,826	
RQDA18					,760	
QAD9						,721
QAD3						,511
QDA17						,429

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 9 iterations.

Source: Author

TABLE VII.   T-test

		N	Mean	Std. Dev.	Mean Difference	t	Sig. (2-tailed)
QAD1	1 expectation	410	4,81	,50	1,80	30,248	,000
	2 perception	410	3,01	1,09	1,80	30,248	,000
QAD2	1 expectation	410	4,08	,90	1,21	16,761	,000
	2 perception	409	2,87	1,15	1,21	16,756	,000
QAD3	1 expectation	410	4,09	,91	,19	3,050	,002
	2 perception	409	3,89	,88	,19	3,050	,002
QAD4	1 expectation	410	4,43	,79	1,64	23,420	,000
	2 perception	409	2,79	1,17	1,64	23,410	,000
QAD5	1 expectation	409	4,84	,50	2,22	33,786	,000
	2 perception	409	2,62	1,23	2,22	33,786	,000
QAD6	1 expectation	410	4,79	,55	2,63	50,207	,000
	2 perception	409	2,16	,91	2,63	50,178	,000
QAD7	1 expectation	409	4,72	,60	2,11	36,172	,000
	2 perception	409	2,61	1,01	2,11	36,172	,000
QAD8	1 expectation	409	4,35	,95	1,32	16,989	,000
	2 perception	409	3,03	1,25	1,32	16,989	,000
QAD9	1 expectation	409	4,76	,63	1,47	25,861	,000
	2 perception	409	3,29	,96	1,47	25,861	,000
QAD10	1 expectation	409	3,24	1,30	-,78	-4,120	,000
	2 perception	409	4,02	3,61	-,78	-4,120	,000
QAD11	1 expectation	409	2,66	1,10	-,81	-10,853	,000
	2 perception	409	3,47	1,03	-,81	-10,853	,000
QAD12	1 expectation	409	1,97	1,20	-1,75	-21,391	,000
	2 perception	409	3,72	1,14	-1,75	-21,391	,000
QDA13	1 expectation	409	1,93	1,17	-1,51	-17,848	,000
	2 perception	409	3,44	1,24	-1,51	-17,848	,000
QDA14	1 expectation	409	4,42	,87	1,73	25,800	,000
	2 perception	409	2,69	1,04	1,73	25,800	,000
QDA15	1 expectation	409	4,56	,74	1,85	29,568	,000
	2 perception	409	2,71	1,03	1,85	29,568	,000
QDA16	1 expectation	409	4,80	,58	2,06	31,906	,000
	2 perception	409	2,74	1,17	2,06	31,906	,000
QDA17	1 expectation	410	4,57	,70	1,54	27,326	,000
	2 perception	409	3,03	,91	1,54	27,317	,000
QDA18	1 expectation	409	3,08	1,27	-,61	-7,094	,000
	2 perception	409	3,69	1,20	-,61	-7,094	,000
QDA19	1 expectation	409	4,90	,35	1,80	28,057	,000
	2 perception	409	3,10	1,25	1,80	28,057	,000
QDA20	1 expectation	409	3,40	1,18	-,61	-4,313	,000
	2 perception	409	4,01	2,61	-,61	-4,313	,000
QDA21	1 expectation	410	3,17	1,30	-,19	-2,179	,030
	2 perception	409	3,35	1,14	-,19	-2,179	,030
QDA22	1 expectation	408	2,69	1,27	-1,07	-12,885	,000
	2 perception	409	3,76	1,09	-1,07	-12,883	,000

Source: *Author*

Sažetak

PRIMJENA MULTIVARIJATNE STATISTIČKE ANALIZE U MJERENJU KVALITETE USLUGA VISOKOG OBRAZOVANJA

Koncept kvalitete usluga, te razvoj metoda i tehnika za mjerenja kvalitete usluga i zadovoljstva klijenta u visokom obrazovanju, postaje glavna tema istraživanja posljednjih godina. U istraživanju se ispitivala očekivana i stvarna kvaliteta usluga u visokom obrazovanju za turistički i hotelski menadžment, primjenom SERVQUAL instrumenta. Podaci su se prikupljali upitnikom koji se sastojao iz dva dijela: prvi dio, odnosi se na ispitivanje očekivanja studenata od institucija visokog obrazovanja općenito, dok se drugim dijelom ispitivala kvaliteta usluga na Fakultetu za turistički i hotelski menadžment Opatija. Cilj istraživanja je multivarijatna statistička analiza SERVQUAL ljestvice, prilagođene za visoko obrazovanje. Posljednji dio rada sadrži smjernice za buduća istraživanja kvalitete usluga u visokom obrazovanju.

Ključne riječi: kvaliteta usluga, mjerenje, SERVQUAL, multivarijatna statistička analiza, visoko
     obrazovanje, case study.

Zusammenfassung

DIE ANWENDUNG DER MULTIVARIATE STATISTISCHER ANALYSE IN DER DIENSTLEISTUNGSQUALITÄTMESSUNG IN DER HOCHAUSBILDUNG

Das Hauptthema jüngster Zeit ist die Konzeptualisation von Dienstleistungsqualität und die Entwicklung der Messungstechniken für die Bewertung von Dienstleistungsqualität und Kundenzufriedenheit in der Hochausbildung. Diese Forschung hat die Studentenerwartungen und Wahrnehmungen in der Hochausbildung für Tourismus und Hotelmanagement mit Anwendung von SERVQUAL Instrument untersucht. Die Daten wurden in zwei Teilen der Befragung gewonnen. Der erste Teil bezieht sich auf Studentenerwartungen und der zweite auf die Studentenwahrnehmungen. Das Forschungsziel ist die Multivariate Statistische Analyse (die Faktorenanalyse und Reliability-Analyse) der SERVQUAL-Skala angepasst der Tourismus und Hotelmanagement Ausbildung. Im letzten Teil der Arbeit wird über die Vorschläge für Dienstleistungsqualitätmessung in der Tourismus und Hotelmanagement Hochausbildung diskutiert.

Schlüßelwörter: *Dienstleistungsqualität, Messung, SERVQUAL, Multivariate Statistische Analyse,*
     Hochausbildung, Case Study.