A Decision Making Tool For The Improvement Of Service Quality At Universities

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ABSTRACT

There have been numerous studies conducted on the evaluation of service quality at universities. However, there remains a deficiency on using a Multi Criteria Decision making approach in determining factors to consider for the improvement of service quality at a university. The purpose of this paper is to report on the use of Analytic Hierarchy Process (AHP) as a decision making tool in determining factors to consider for the improvement of service quality at a university. The study adopted a mixed method methodology and an action research approach was employed. A purposive convenient sample of 30 participants was used. Data was collected via questionnaires and face-to-face interviews. The data was captured in the software Expert Choice and the results were processed by taking the aggregated group judgements as the geometric mean of the individual comparisons. The findings reveal that organisational and educational issues are paramount to providing an effective service at tertiary institutions.

Keywords: Service Quality; Decision Making Tool

1. INTRODUCTION

Decision making can be regarded as one of the most important activities in any organisation and tertiary institutions are not an exception. In order to make decisions one requires reliable and accurate information that is readily available. Chamodrakas, Batis, and Martakos (2010) state that a decision making problem, is often associated with selecting the most appropriate alternative according to at least one goal or criteria, from a group of alternatives.

Tertiary institutions remain competitive in attempting to attract and retain fee paying students (Koni, Zainal, & Ibrahim, 2013; Khodayari & Khodayari, 2011). Conversely, in this highly competitive environment, students have become more circumspect in their selection and more demanding of the tertiary institutions they choose (Stone, 2005). Over the past decade, academic literature has demonstrated how tertiary institutions have concentrated particularly on service quality as a vehicle to attract and retain students. However, the challenge remains as to which factors of service quality should managers of tertiary institutions consider and implement. It is against this background that this paper uses Analytic Hierarchy Process (AHP) as a decision making tool in prioritizing factors for the improvement of service quality at a university.

2. BACKGROUND

Service quality is the extent to which a service meets or exceeds the expectations of customers (Jain Sinha & De, 2010). O'Neil & Palmer (2004) define service quality in higher education as the discrepancy between students expectation versus perception of the delivery. The importance of service quality in higher education has attracted many researchers to empirically examine service quality with a wide array of studies undertaken at various tertiary institutions from countries across the world. Stukaline (2012) asserts that universities employ student satisfaction data to better understand and improve their educational environment with the aim to increase retention rates.

The framework utilized in this study known as Analytic Hierarchy Process (AHP) was initially developed by Thomas Saaty as a multi-criteria decision support technique (Saaty, 1990). AHP has been widely applied as a multi-criteria decision making approach in industry, government and academic institutions (see Saaty, 1990). AHP allows decision-makers to structure a complex problem that involves subjective criteria as a decision hierarchy. The AHP method is based upon three principles: first, structure of the model; second, comparative judgment of the alternatives and the criteria; and third, synthesis of the priorities (Amiri, 2010).

When dealing with a Multi-Criteria decision making problem, the first step is to identify the stakeholders associated with it, their assumptions and values. Then the actual problem needs to be structured. A suitable way for achieving this with many complex issues is to develop a hierarchy. A hierarchy has at least three levels. The top of the hierarchy is the main goal, which is decomposed at the second level into several sub-goals, reflecting different perspectives of the decision-making process. Each sub-goal may be affected by a number of factors, while at the lowest level of the model the alternative choices are introduced. Once the problem has been decomposed and the hierarchy is constructed, prioritization procedure starts in order to determine the relative importance of the criteria within each level. The elements in each cluster of the hierarchy are compared in a pairwise manner with relation to their importance with respect to the root of the same cluster. Such comparisons are simpler than having to evaluate the total contribution of a factor towards the main goal, taking into account all sub-goals simultaneously. The comparison scale used, as defined by Saaty (1990), has values from 1 – 9 depending on the degree of importance as found in Table 1. It is a ratio scale measuring the ratios of intensities of importance of the factors.

Table 1: The Comparison Scale used to Assess the Relative Importance of One Factor over Another Element in the Original Analytic Hierarchy Process (Saaty, 1990)

Intensity of Importance	Definition
1	Equal Importance
3	Moderate importance of one over another
5	Essential or strong importance
7	Very strong or demonstrated importance
9	Absolute importance
2, 4, 6, 8	Intermediate values between adjacent scale values

The result of the pairwise comparison on n criteria can be summarized in an $(n \times n)$ evaluation matrix A in which every element; a_{ij}, $(i; j) = 1,2,3, \dots, n$ the quotient of weights of the criteria, as shown below. Let $C = \{C_j | j = 1,2, \dots, n\}$.

$$A = \begin{pmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{pmatrix} \qquad a_{ii} = 1 \quad a_{ij} = 1/a_{ji} \quad a_{ij} \neq 0$$

At the final step, the mathematical process commences to normalize and find the relative weights for each matrix. The relative weights are given by the right eigenvector (w) corresponding to the largest Eigen value λ_{max} as:

$$A_w = \lambda_{max} = W$$

In the event of the pairwise comparisons being completely consistent, then the matrix A has the rank 1 and $\lambda_{max} = n$. In this instance; weights can be obtained by normalizing any of the rows or columns of A. It should be noted that the quality of the output of the AHP is related to the consistency of the pairwise comparison judgments. The consistency is defined by the relation between the entries of A: $a_{jk} * a_{jk} = a_{ik}$. The consistency index (CI) is: CI = $(\lambda_{max} - n)/(n - 1)$. The consistency ratio (CR), which indicates whether the evaluations are sufficiently consistent, is calculated as the ratio of the CI and the random index (RI).

CR = CI/RI

The consistency ratio should be less than 0.1.

2.1 AHP and Group Decision Making

Aczel and Saaty (1983) established the basis for aggregating group judgments in the AHP. A group support facility is provided in Expert Choice and Team Expert Choice, a software package implementing AHP which was designed by Forman and Saaty (Expert Choice). Saaty (1994) and Dyer & Forman (1992) describe the theoretical problems related to the use of AHP as a group decision-making tool. They highlight that when it is possible to reach consensus or a compromise with the group, one may use the classical AHP procedure. Then the judgments are generated as if a single decision-maker is their originator.

In the event of a compromise not be attained inside the group, in order to apply consensus, Aczel and Saaty (1983) have shown the geometric mean is the uniquely appropriate rule for combining judgments, since it preserves the reciprocal property of the judgement matrix containing the pairwise comparisons.

As mentioned by Petkova (1999), in group decision making it is often important to keep the data submitted by each member of the group, while allowing for their subsequent joint processing and integration. Then the most convenient approach for documenting the individual judgments is to use separate clusters of the model for each decision-maker. The separate clusters may be given equal weights, or the weight may vary depending on the standing of the group member and his/her real influence over the final decision.

3. RESEARCH DESIGN

The study adopted a mixed method methodology and an action research approach was employed. A sampling technique known as purposive convenience sampling was employed as participants were selected for the study. The empirical work undertaken in the study involved a total of 30 participants who were senior members of university and experts in the field of quality assurance. Participants were drawn from academic and administrative staff from academic departments. Two independent workshops were conducted, with the first workshop consisting of 15 participants from the Pietermaritzburg Campus, and the second consisting of 15 participants from the Durban Campus of the Durban University of Technology (DUT). The responses were collected from a questionnaire comprising of pairwise comparisons between the factors that constitute the objectives. The responses were captured in a software package called Expert Choice (Version 11) and the results were processed by taking the aggregated group judgments as the geometric mean of the individual comparisons using Analytic Hierarchy Process (AHP). In addition, data was collected via face-to-face interviews. The study demanded that the participants be allowed to uninhibitedly express their views and opinions. The aim of the workshops was to determine the prioritisation of factors for the improvement of service quality at a university.

3.1 Brainstorming Issues Associated with the Evaluation of Service Quality

A brainstorming technique was employed to generate ideas for the improvement of service quality. A flip chart was used to document all the ideas generated from the participants of the workshops. The following are the main issues raised by the participants:

- Staff need to be more courteous and friendly towards students.
- There is a need to have an evaluation system/procedure in place at the university.
- Students need to be mindful of their contribution towards service delivery.
- There is a need to provide skills training to develop customer service.
- The new general education curriculum at the university should incorporate a module on service delivery.
- The quality of service is not consistent among the various departments and units of the university.
- There seems to be a lack of ownership in ensuring and evaluating service quality holistically.
- Staff feel they are answerable to “many bosses.”

- Subject and lecturer evaluation practices should incorporate elements of service quality of the institution as a whole.
- There is a need to create an organisational culture of efficient service.

The issues together with the rankings are found in the results section of this paper.

3.2 Prioritization of Factors Influencing the Improvement of Service Quality

After the brainstorming exercise which assisted in determining the important factors to consider in the improvement of service quality of a university, it was important to prioritise the criteria that were identified. The Multiple-Criteria Decision-Making (MCDM) model called the Analytic Hierarchy Process (AHP), which was developed by Saaty (1990) was used for the prioritisation process. A 1 – 9 point scale of the original AHP was used in measuring the judgements of the participants through pairwise comparisons about the ratios of the weights of the criteria (Saat,y 1990). The participants made comparisons using questionnaires. In order to proceed with the prioritisation process, the ideas identified were grouped into three broad issues, *viz.* Organisational; Educational; and Staff & Student issues:

Organisational Issues:

- Develop and install a service quality evaluation system at the university.
- Lack of ownership in ensuring and evaluating service quality.
- Create an organisational culture of efficient service delivery.
- Quality of service is not consistent across the university.
- Subject and lecturer evaluation practices to incorporate elements of service quality.

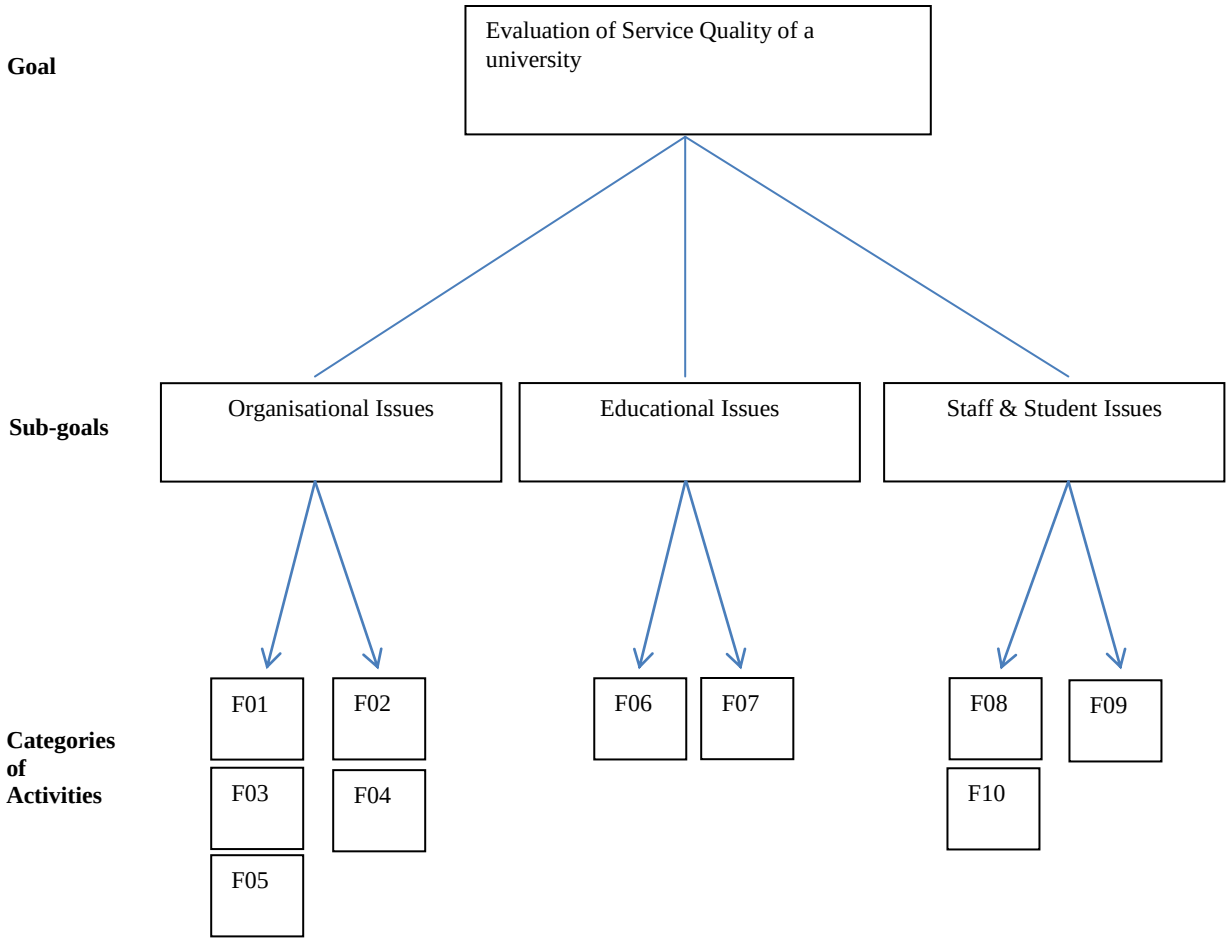
Educational Issues:

- Provide skills training to develop customer service.
- New General Education & Training (GET) curriculum to incorporate a module on service delivery.

Staff and Student Issues:

- Students to know their part in co-producing the service.
- Staff feel answerable to many bosses.
- Staff to exercise courtesy towards students.

Based on the afore-mentioned information the hierarchical structure of the problem was developed and is shown in Figure 1.



F01	Develop & install service quality evaluation system	F06	Need to provide skills training
F02	Lack of ownership	F07	New GET curriculum to incorporate Service Delivery
F03	Create organisational culture	F08	Students to know their part in co-producing the service
F04	Quality of service not consistent	F09	Staff feel answerable to many bosses
F05	Subject & lecturer evaluation practices	F10	Staff to exercise courtesy towards students

Figure 1: A Hierarchical Representation of the Criteria for the Improvement of Service Quality

The implementation of the Multiple Criteria Decision Analysis (MCDA) model for the evaluation of service quality at a university was conducted with the groups.

In determining the issues that are considered most significant to the improvement of service quality, it was essential to prioritise the criteria outlined in the second and third tier of the hierarchy. This was achieved by undertaking a pairwise comparison. The pairwise comparison was processed with the software, Expert Choice.

3.3 The Results

The participants were then asked to rank the above issues in terms of importance to the improvement of service quality at the university. A rating scale of 1 to 10 was used, where 1 represented little and 10 was extreme importance.

Table 2: Ideas Generated during the Brainstorming Sessions

	Issues	Rating
1	Staff to exercise courtesy towards students	9
2	Develop and install a service quality evaluation system at the University	10
3	Students to know their part in co-producing the service	8
4	Provide skills training to staff to develop customer service	10
5	New general education curriculum to incorporate a module on service delivery	7
6	Quality of service is not consistent across the university	6
7	Lack of ownership in ensuring and evaluating service quality	9
8	Staff feel answerable to many bosses	6
9	Subject and lecturer evaluation practices to incorporate elements of service quality	5
10	Create an organisational culture of efficient service delivery.	10

From the rating exercise it was deduced that the participants considered the following issues (ratings 9 and 10) as most important:

- To develop and install a service quality evaluation framework at the University
- To provide training to staff to develop proficiency in customer service
- To create an organisational culture of efficiency in service delivery
- Staff to exercise courtesy towards students
- To establish ownership in ensuring and evaluating service quality

Firstly, the priorities for the objectives that relate to the sub goal, i.e. Organisational, Educational and Staff and Student issues.

	Organisational issues	Educational issues	Staff and Student issues	Priority
Organisational issues	1	2.4	2.2	***0.532***
Educational issues		1	2.3	***0.292***
Staff and Student issues			1	***0.175***

The results show that the Organisational issues (0.532) and the Educational issues (0.292) had the highest priorities as reflected by all the respondents. The inconsistency index was found to be 0.02 and this is acceptable within the context and analysis of the AHP.

We then considered the global priorities in relation to the goal of evaluating the service quality of a university.

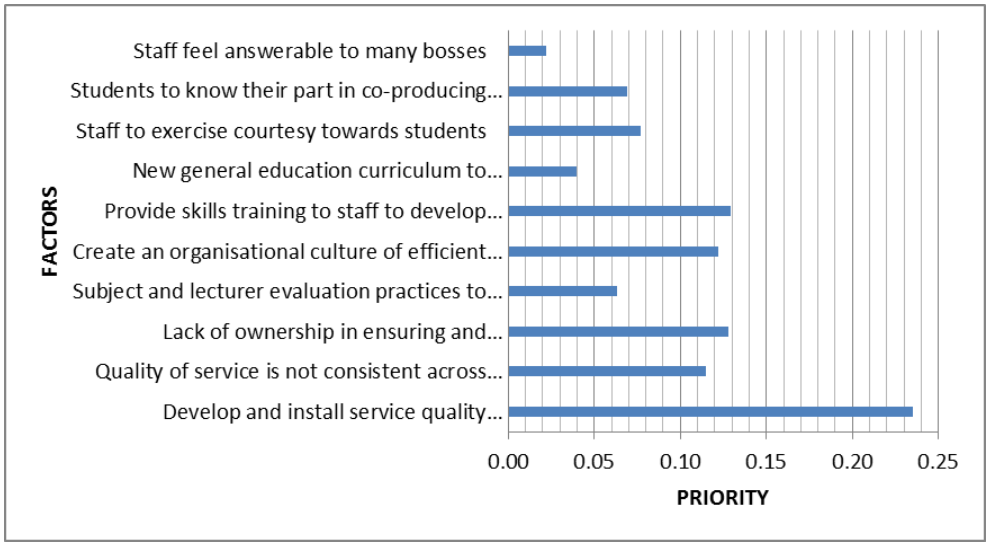


Figure 2: Global Priorities with Respect to the Main Goal: Evaluation of Service Quality of a University

The inconsistency factor was found to be 0.08. The results reveal that the Develop and install a quality service evaluation system at the university (0.235), Provide skills training to develop customer service (0.129) and Lack of ownership in ensuring and evaluating service quality (0.128) were the issues that were found to be the most important in contributing towards the overall goal of evaluating the service quality of a university. These variables account for just below 50% i.e. 49.2% of the importance in explaining service quality of a university.

3.3.1 Overall Comparison

We then focused our attention on the overall analysis between Pietermaritzburg and Durban campuses but separated out the priority scores pertaining to each campus. This was done using the group decision mode in Expert Choice.

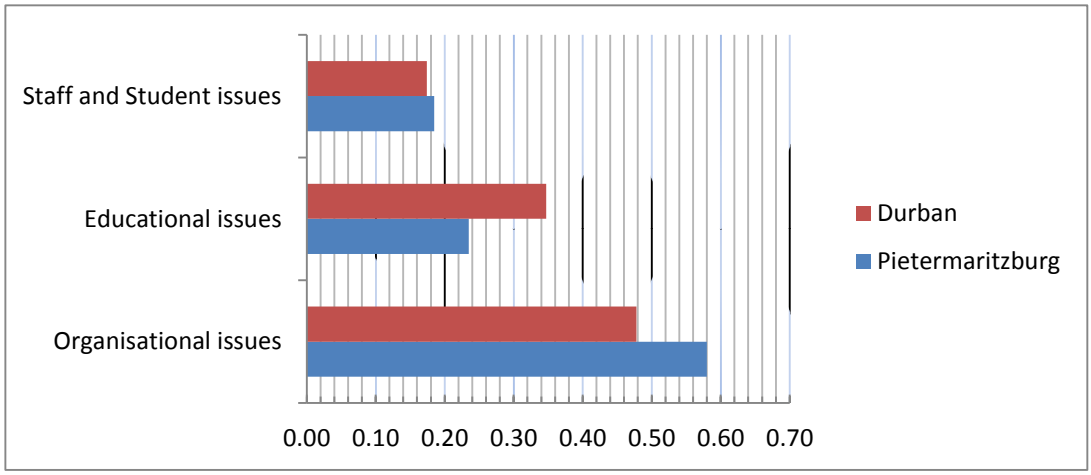


Figure 3: Priorities for the Second Level Issues: Staff and Student Issues; Educational Issues and Organisational Issues (Durban versus Pietermaritzburg comparison)

It was evident from the figure above, that Organisational issues had the highest priorities in both Pietermaritzburg and Durban campuses with the Organisational priority at Pietermaritzburg (0.594) being higher than that of Durban (0.478). The second most important objective was the Educational issue with Durban having a higher priority (0.347) than that of Pietermaritzburg (0.249). Staff and student issues are of a similar magnitude across both campuses but are ranked the least important on both campuses as well.

Factor	Pietermaritzburg	Durban
Develop and install a service quality evaluation system at the University	0.256	0.213
Quality of service not consistent across the university	0.113	0.115
Lack of ownership in ensuring and evaluating service quality	0.129	0.127
Subject and lecturer evaluation practices to incorporate elements of service delivery	0.063	0.069
Create an organisational culture	0.126	0.110
Provide skills training to staff to develop customer service	0.104	0.155
New GET curriculum to incorporate a module on service delivery	0.033	0.047
Staff to exercise courtesy to students	0.082	0.078
Students to know their part in co-producing the service	0.072	0.065
Staff feel answerable to many bosses	0.021	0.022

3.3.2 The Findings

It was evident from the research that the most important priorities for Pietermaritzburg Campus were Develop and install a service quality evaluation system at the university (0.256), Lack of ownership in ensuring and evaluating service quality (0.129) and create an organisational culture (0.126). These three factors constitute 51.1% of the importance in priorities in Pietermaritzburg. On the other hand, the most important priorities in Durban were

Develop and install a service quality evaluation system at the University (0.213), Provide skills training to staff to develop customer service (0.155) and Lack of ownership in ensuring and evaluating service quality (0.127). The three factors constitute 49.5% of the importance of the priorities for the Durban campus. One can see that there are also differences between priorities of variables such as Create an organisational culture and Provide skills training to staff to develop customer service across both campuses. The findings of this research collaborate with research undertaken in the area of service quality see (Stukalina, 2012; Chow & Luk, 2005).

4. RECOMMENDATIONS

There are some salient aspects of this research which need to be highlighted. The organisational and educational issues are considered as paramount in providing an effective service at a university. The most important variables noted overall were Develop and install a quality service evaluation system at the University, Provide skills training to develop customer service and Lack of ownership in ensuring and evaluating service quality. Pietermaritzburg and Durban campuses are similar with respect to their most important priorities but differ in that the Durban campus requires more training skills to be imparted to their staff. One of the recommendations to Durban is to have more training courses for their staff, provide incentives to staff for re-training and focus on training staff specific to where there are areas requiring attention.

5. CONCLUSION

This paper has illustrated the application of AHP as a decision making tool in determining factors to consider for the improvement of service quality at a university. The AHP is both a flexible and relevant tool with a wide range of applications in decision making. A pairwise comparison method was used to calculate the weight for each criterion based on data collected from the participants at the workshops. This study provides a platform for similar studies to be conducted across other public and private tertiary institutions. Similar studies using large samples with more intense criteria models would be useful in order to corroborate this study's findings and to address the limitation of the small sample size.

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