บทความวิจัย

ผลกระทบของหลักการบริการคุณภาพต่อผลสัมฤทธิ์ทางการศึกษาของนักศึกษา

The Impact of Total Quality Management Principles on Students' Academic Achievement : An Empirical Study[1]

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Abstract

This study investigates the relationship between principles of total quality management (TQM) and educational organization outcome in respect to students'academic achievement. TQM principles include organizational commitment to quality, planning for quality, focus on customer (students), total staff involvement, training and development, rewards and recognition, management by

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fact, continuous improvement, and focus on processes and prevention. Students' academic achievement variables include degree score, success rate of leavers, and perceived students' academic achievement. The study was based on a survey design and the time horizon was cross sectional with minimal reseacher's interfernce. The survey was carried out in 100 educational departments selected randomly from 10 public universities in Malaysia. The final number of participants for this study was 85 educational departments. The sample size comprised about 70 percent pf the total population. The study hypotheses were tested using correlational and multivariate statistical analyses. The results supported all the hypotheses posited for the study, suggesting that education organizations can benefit from TQM principles. Pearson-r correlations indicated that all of the TQM principles have significant correlations with students' academic achievement variables. Regression analyses indicated significantly positive relationships. Further, results of statistical analysis also indicated that the principles should be implemented holistically rather than piecemeal. In conclusion, this study provided insight and further understanding of the effect of TQM principles on organizational performance, and hence allows practitioners to gain in depth knowledge about the impact of TQM principles.

บทคัดย่อ

การศึกษาครั้งนี้เป็นการศึกษาเชิงสำรวจแบบ Crossectional study โดยมีวัตถุประสงค์เพื่อศึกษา ความสัมพันธ์ระหว่างหลักการบริหารคุณภาพโดยรวม (TQM) กับผลลัพธ์ของการบริหารการศึกษาเกี่ยวกับผลสัมฤทธิ์ทางการศึกษาของนักศึกษา หลัก TQM ในที่นี้หมายรวมถึงตัวแปรต้นเกี่ยวกับการมุ่งมั่นขององค์กรที่จะบริหารคุณภาพภายในการวางแผนงานคุณภาพ การเน้นนักศึกษาเป็นสำคัญ การมีส่วนร่วมของอาจารย์ การฝึกอบรมและพัฒนา การให้รางวัลและเชิดชูเกียรติ การบริหารจัดการโดยอาศัยความเป็นจริงเป็นหลัก การพัฒนาอย่างต่อเนื่อง รวมทั้งการให้ความสำคัญต่อกระบวนการและการป้องกัน ส่วนตัวแปรตามของการศึกษานี้ ประกอบด้วยผลสัมฤทธิ์ทางการศึกษาของนักศึกษา หมายถึงคะแนนรวมที่สำเร็จการศึกษา อัตราสำเร็จของนักศึกษาที่หยุดพักการศึกษาชั่วคราว และการรับรู้ของนักศึกษาต่อผลสัมฤทธิ์ทางการศึกษา โดยส่งแบบสอบถามไปยังคณะต่างๆ ทางการศึกษา 100 คณะ โดยสุ่มเลือกจาก 10 มหาวิทยาลัยของรัฐ ในประเทศมาเลเซีย จำนวนที่ตอบกลับคือ 85 คณะ คิดเป็นร้อยละ 85 ของ จำนวนประชากรทั้งหมด สมมติฐานในการศึกษาครั้งนี้ ทดสอบโดยใช้การวิเคราะห์ทางสถิติ หาความสัมพันธ์ของตัวแปร Correlation พบว่าข้อสมมุติฐานทุกข้อเป็นไปตามสมมติฐานที่กำหนดไว้ โดยวิธี Peason Correlation ชี้ว่า หลักจของ TQM มีความสัมพันธ์กับตัวแปรทางด้านผลสัมฤทธิ์ทางการศึกษาของนักศึกษาในทางบวก และผลของการวิเคราะห์ด้วย Regression Analysis พบว่าหลัก TQM มีความสัมพันธ์อย่างมีนัยสำคัญกับผลสัมฤทธิ์ทางการศึกษาของนักศึกษาด้วย โดยสรุปการศึกษานี้ได้ให้ความเข้าใจอย่างแท้จริงเกี่ยวกับหลักการบริการคุณภาพที่มีผลต่อการปฏิบัติงานขององค์กร และส่งเสริมให้ผู้ปฏิบัติงานได้รับความรู้ในเชิงลึกเกี่ยวกับผลกระทบของหลักบริการคุณภาพโดยรวมผู้วิจัยเสนอแนะว่าองค์กรทางการศึกษาจะได้รับประโยชน์จากการนำหลักบริหารคุณภาพโดยรวมไปใช้ทั้งองค์ทางการศึกษามากกว่าจะนำไปใช้ในงานบางส่วนขององค์กรหลัก

INTRODUCTION

Today, the ability of an organisation to compete in the rapidly emerging global economy depends largely on the quality of its products and services. Hence, the issue of quality has been given the highest priority in many organisations and quality excellence has become a major business strategy. Many organisations are beginning to recognise Total Quality Management (TQM) as the way forward.

The concept of TQM was developed after World War II by a number of pioneers who advance the methodology of quality control in manufacturing and develop theories and practical techniques for improving the production quality of goods and services. The most visible of these pioneers were W. Edwards Deming, Joseph M. Juran, Armand V. Feigenbaum, Kaoru Ishikawa and Philip Crosby. Initially, the concept was not taken seriously by the Americans until the Japanese, who adopted it in 1950 to resurrect their post-war business and industry, used it to dominate selected world markets in the 1980s. From then on there has been an increasing emphasis on quality and TQM among the manufacturing and service organisation throughout the world.

Like other organisation, educational institutions are expected to be affected by the revolytionary changes taking place today. Consequently, the operating environment is becoming more complex and uncertain, and the organisational structures in institutions of higher learning need to adapt and change at an even greater pace than in the past. Competitiveness, and perhaps even future survival of these institutions, will depend to a large extent on the ways in which change and improvements are managed.

In response to the challenge, many colleges and universities world-wide have begun to explore various management practices. However, many of these management practices have failed. For this reason, when TQM was first introduced into educational institutions it was regarded as another management fad, something that will fade away with time. However, this has proven to be wrong as more and more evidence of successful implementation of TQM has been published in a number of renowned internationals journals. Numerous articles have suggested that TQM can improve different aspects of education quality, for example, students' performance (Lozier & Teeter, 1996; Schargel, 1996; Hansen & Jackson, 1996), quality of teaching (Winter, 1993), staff development and performance (Zink & Schmidt, 1995; Idrus, 1995), and oter areas. Unfortunately, the evidence in favour of TQM in higher education is mostly anecdotal (Koch & Fisher, 1998).

According to Zainal Ariffin Ahmad et al.(1997),TQM initiatives in Malaysian higher education institutions started in 1994. The implementation of TQM was initiated by government mandates, competition among universities, and inculcation of corporate thinking into university (mininise cost, customer satisfaction) . Most institutions developed their own model and roadmap for the application of TQM. In addition, Quality Council or Quality Steering Committee are created and quality organisation or centre of excellence, such as the Centre for Total

Quality Education in the University of technology Mara (formally known as Institute of Technology Mara); Quality Management Institute in the Northern University of Malaysia; and the Quality Bureau in the University Science of Malaysia, are used to facilitate the implementation process.

OBJECTIVE

The objective of this research is to investigate the relationship between principles of total quality management (TQM) and educational organization outcome in respect to students' academic achievement. TQM principles include organizational commitment to quality, planning for quality, focus on customer (students), total staff involvement, training and development, rewards and recognition, management by fact, continuous improvement, and focus on processes and prevention. Students' academic achievement variables include degree score, success rate of leavers, and perceived students' academic achievement. This study is of importance owing to scarity of empirical research about the relationship between principles of total quality management and educational organization outcomes.

METHODLOGY

The study was based on a survey design and the time horizon was cross sectional with minimal researcher's interference. The format and content of questionnaire were inititally developed from a through literature review, and pre-tested in several educational departments within two public unversities using convenient sampling. Respondents were requested to focus on questions related to (a) degree or extent of practice of TQM principles in their organizations with items followed a 7-point scale ranging from 'not implemented' (0) to 'very high' (6); and (b) educational organization outcomes over the 3-year period in respect to success rate of leavers and perceived students' academic achievement. Success rate is defined as follows:

$$\text{Success rate of leavers} = \frac{\text{Number of leavers who successfully obtained a qualification over the past three years}}{\text{Total number of leavers over the past three years}}$$

Success rate is based on leavers over a three-year period in order to reduce the influence of temporary fluctuations in this vaiable (Johnes & Taylor, 1990). These performance indicators were measured on interval rating scales. In addition, to make the study more objective, real degree results for these educational departments were obtained from the university registrars. In specify, a degree score was computed for each educational department based on the degree performance over a 3-year period. This degree score was defined as follows (Johnes & Taylor, 1990):

Degree score

$$= \frac{(3 \text{ x first class}) + (2 \text{ x upper second class}) + (1 \text{ x second lower \& third class})}{\text{Total number of graduates over a 3 - year period}}$$

Based on the data obtained from the pilot study involving 35 respondents from a few educational organization, the latent constructs were validated. Table 1 contains the number of items mesuring each construct as well as the reliability values. The construct validity of each latent variable was evaluated by factor analysing the measurement items of each of the construct. Results from factor analyses showed that the latent constructs were unifactorial (Saraph et al., 1989).

Since the primary objective of this measuring instrument is to measure the actual level of practice of each of the TQM principles and to collect information on educational organisation's students' academic achievement, administrators (dean or deputy dean) are appropriate subjects. The survey was carried out in 100 educational departments offering undergraduate degree programme(s) selected randomly from 10 public universities in Malaysia. The final number of participants for this study was 85 educational departments. The sample size comprised about 70 percent of the total population.The study hypotheses were tested using correlational and regression analyses.

ANALYSIS AND RESULTS

Research Hypotheses

Expressed in words the alternative hypotheses are:

(1) TQM principles have positive correlation/ relationships with success rate of leavers;

(2) TQM principles have positive correlation/ relationships with perceived students'

Table 1 Reliability results for the latent constructs

constructs	Number of items	Cronbach's Alpha
TQM:		
Commitment to quality	6	0.897
planning for quality	7	0.946
Focus on customer	6	0.894
Total staff involvement	6	0.932
Rewards and recognition	6	0.941
Management by fact	6	0.934
Training and development	8	0.964
Continuous improvement	6	0.958
Focus on processes and prevention	5	0.948
Students' academic achievement:		
Perceived students' academic achievement	3	0.924

academic achievement; and

(3) TQM principles have positive correlation/ relationships with degree score.

Data Analysis

Normality of the observed variables is assessed through the examination of skewness and kurtosis values. None of the observed variable is significantly skewed or highly kurtosis. All observed variables appear to be linearly related (though scatter plots). Furthermore, using Mahalanobis distance no obvious outlier is detected.

Table 2 exhibits results of Pearson's product-moment correlation among TQM variables. All the TQM principles correlate significantly with each other ($p \leq 0.01$). In examining the correlations among the construcrs of TQM, Ahire et al. (1996) noted that all of the correlations among the constructs were positive indicating that the quality management strategies should be implemented holistically rather than piecemeal.

Table 3 shows the correlation of TQM principles with students' academic achievement variables. Most of TQM principles show moderate to strong correlation with degree score, success rate of leavers and perceived strdents' academic achievement . Note that all the TQM principles are highly significant with perceived strdents' academic achievement indicating the importance of TQM principles. The researchers conclude that each TQM principles is significantly positive correlated with at least one of the students' academic achievement variables.

Table 2 Pearson's correlation among TQM principles

	1	2	3	4	5	6	7	8	9
1 Commitment to quality	1.000								
2 Planning for quality	.739**	1.000							
3 Focus on customer	.587**	.620**	1.000						
4 Total staff involvement	.639**	.608**	.830**	1.000					
5 Rewards and recognition	.561**	.650**	.668**	.664**	1.000				
6 Management by fact	.504**	.682**	.571**	.590**	.702**	1.000			
7 Training and development	.618**	.656**	.624**	.686**	.722**	.750**	1.000		
8 Continuous improvement	.550**	.668**	.653**	.670**	.617**	.716**	.767**	1.000	
9 Focus on processes and prevention	.504**	.673**	.649**	.682**	.670**	.796**	.724**	.731**	1.000

1. **p≤ 0.01
2. All t-test are one-tailed

Table 3 Pearson's correlation between TQM princeples and students' academic achievement variables

		Degree score	Success rate of leavers	Perceived students' academic achievement
1	Commitment to quality	.165	.381**	.446**
2	Planning for quality	.291**	.331**	.367**
3	Focus on customer	.099	.335**	.374**
4	Total staff involvement	.049	.323**	.440**
5	Rewards and recognition	.252*	.148	.378**
6	Management by fact	.283**	.205*	.384**
7	Training and development	.289**	.093	.460**
8	Continuous improvement	.161	.248*	.476**
9	Focus on processes and prevention	.288**	.174	.327**

1. *p ≤ 0.05, **p ≤ 0.01
2. All t-test are one-tailed

Table 4 shows the multiple regression analyses between TQM principles and strdents' academic achievement variables. The multiple regression analyses indicate that strong relationships existed as hypothesized. The three multiple regression models have moderately high values of R^2, from 0.209 to 0.309. All models ezhibited significant F values.

Table 4 Multiple regression analysis between TQM principles and degree score

Independent variable (TQM)	Degree score				
	Beta	Std.Error	Std.Beta	t	Significance
Constant	1.288	0.121		10.674	0.000
Commitment to quality	-0.004	0.042	-0.018	-0.105	0.917
Planning for quality	0.052	0.040	0.257	1.296	0.199
Focus on customer	0.002	0.040	0.008	0.038	0.970
Total staff involvement	-0.074	0.039	-0.416	-1.884	0.064
Rewards and recognition	0.008	0.030	0.051	0.265	0.791
Management by fact	0.001	0.029	0.003	0.016	0.987
Training and development	0.051	0.032	0.335	1.631	0.107

Table 4 Multiple regression analysis between TQM principles and degree score

Independent variable (TQM)	Degree score				
	Beta	Std.Error	Std.Beta	t	Significance
Continuous improvement	0.038	0.031	-0.234	-1.226	0.224
Focus on processes and prevention	0.040	0.028	0.294	1.416	0.161
R^2	0.209				
Adj.R^2	0.109				
Significance of F	0.042				

Table 4 Multiple regression analysis between TQM principles and success rate of leavers (continued)

Independent variable (TQM)	Success rate of leavers				
	Beta	Std.Error	Std.Beta	t	Significance
Constant	0.161	1.109		0.145	0.885
Commitment to quality	0.755	0.381	0.319	1.983	0.051
Planning for quality	0.315	0.368	0.154	0.857	0.394
Focus on customer	0.351	0.365	0.179	0.963	0.339
Total staff involvement	0.428	0.361	0.238	1.186	0.239
Rewards and recognition	-0.259	0.248	-0.171	-1.044	0.300
Management by fact	0.402	0.271	0.282	1.481	0.143
Training and development	-0.882	0.297	-0.577	-2.967	0.004
Continuous improvement	0.299	0.282	0.186	0.061	0.292
Focus on processes and prevention	-0.263	0.255	-0.194	-1.028	0.307
R^2	0.301				
Adj.R^2	0.216				
Significance of F	0.001				

Table 4 Multiple regression analysis between TQM principles and perceived students' academic achievement (continued)

Independent variable (TQM)	Perceived students' academic achievement				
	Beta	Std.Error	Std.Beta	t	Significance
Constant	0.789	0.737		1.070	0.288
Commitment to quality	0.407	0.255	0.245	1.596	0.115
Planning for quality	-0.172	0.245	-0.125	-0.702	0.485
Focus on customer	-0.096	0.244	-0.073	-0.394	0.694
Total staff involvement	0.229	0.238	0.190	0.964	0.338
Rewards and recognition	0.034	0.167	0.033	0.205	0.838
Management by fact	0.116	0.179	0.121	0.674	0.520
Training and development	0.110	0.195	0.106	0.564	0.574
Continuous improvement	0.345	0.189	0.316	1.826	0.072
Focus on processes and prevention	-0.207	0.170	-0.225	-1.213	0.229
R^2	0.309				
Adj.R^2	0.226				
Significance of F	0.001				

However, the researchers detected the problem of multicollinearity on all three models (Dillon and Goldstein, 1984; Hamilton, 1992; Miles and Shevlin, 2001). All models have one or more standardized regression coefficients taking on negative values when common sense and correlational analysis suggest a positive relationship exists between the independent and dependent variables (Table 3 and Table 4). Many of the estimated coefficients are insignificant despite the F values in all models are significant. The strong correlation ($0.504 \leq r \leq 0.830$) among TQM principles also suggesting the presence of multicollinearity in this study (Table 2).

There are several methods that researchers can use to reduce the effects of multicollinearity (Hair et al., 1998). In this study, the principal component analysis was use to handle multicollinearity. TQM principles was analyzed collectivoly and principal component scores of TQM principles were retrieved (Arawati Agus, 2000). A simple linear regression analysis was later carried out between degre score, success rate of leavers, perceived students' academic achievement, and the first saved principal component scores of TQM principles.

Table 5 Simple regression analysis between TQM principles component scores and students' academic achievement variables

Model	Beta	Std.Error	Std.Beta	t	Significance	R^2
Constant	1.414	0.016		90.198	0.000	
Regression IV = Principal component score TQM DV = Degree score	0.014	0.006	0.249	2.284	0.025	0.062*
Constant	5.399	0.150		35.934	0.000	
Regression IV = Principal component score TQM DV = Success rate of leavers	0.168	0.060	0.294	2.789	0.007	0.087*
Constant	4.063	0.092		44.033	0.000	
Regression IV = Principal component score TQM DV = Perceived students' academic achievement	0.187	0.037	0.485	5.055	0.000	0.235*

Results in Table 5 indicate that TQM principles have a significant relationship with students' academic achievement varibles. Therefore, the researchers conclude thatTQM principles have significantly positive relationship with degree score, success rate of leavers and perceived students' academic achievement.

In short, results from the data analysis provide edidence to support all three allternative hypotheses.

SUMMARY AND CONCLUSIONS

A literature review on quality management in education indicates that there are a growing number of anecdotal accounts of the 'success' of TQM in education, however there has been almost no theory-building and methodologically rigorous research (Koch & Fisher, 1998; Lim, 2003). This study would be a great theoretical contribution to the TQM development especially in education.

In this study, it is found that educational organizations can benefit from TQM principles. The signficant positive correlation between principles of TQM and the students' academic achievement indicators provides evidence of criterion related relationship. Implementation of TQM principles is crucial since the principles are found to have significant positive impact on educational organizational outcome in respect to students' academic achievement. Emphasis should be given

to organizational commitment to quality, planning for quality, focus on customer, total staff involvement, training and development, rewards and recognition, management by fact, continuous improvement, and focus on processes and prevention. Findings of this study also provide empirical evidence of the important of implementing the quality management principles holistically rather than piecemeal. Finally, it is hoped that this study would encourage or at least stimulate interest towards future research in the similar area as more research on this subject is necessary.

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