

The effect of TQM strategy on learning satisfaction and loyalty of students - the mediation effect of teaching quality

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ABSTRACT: In 2015, 41 universities had less than 80% of the average freshman registration rate in Taiwan. In 2016, it is estimated that the freshman population will be further reduced by 30,000. This indicates that universities may experience financial difficulties due to the shrinkage of student population. Conducting total quality management (TQM) and enhancing the quality of education are the strategies being adopted by many schools to attract students. This research investigates whether TQM strategies, teaching quality and school brand are conducive to student learning satisfaction and loyalty. The results showed: 1) TQM strategies and teaching quality have significant and positive influence on student learning satisfaction and loyalty; 2) among TQM strategies, student learning satisfaction and loyalty, teaching quality has an intermediary effect. The results of this study can be used as a reference for the recruitment strategy and sustainable management of higher education institutions.

INTRODUCTION

Taiwan's higher education has been facing shrinkage of its student population for years. Moreover, the number of students is expected to decline by 30% over the next 10 years. Therefore, to attract students, universities need to focus on recruitment strategies and improving the quality of education. Quality education is the core function of colleges and universities [1][2], and the total quality management (TQM) strategy is an important approach for achieving this core function [3-8]. Higher education should provide core services, such as teaching and learning [9] and the concept of considering students as the school's customers is no longer new [10]. If the students are highly satisfied with the teaching quality provided by the school, they will become loyal customers; thus, driving their friends and family members to attend the school. This will enable the school to gain competitive advantages in the market [11].

Since 1990, the call for education reform in all countries around the world has been high. Given the successful experience of TQM transformation used in production industries and service industries, the TQM concept began to receive attention from academics and practitioners in Europe and the United States. The characteristics of this research lie in combining TQM strategies [12], while measuring the teaching quality of school organisations according to students' learning satisfaction and loyalty. Through the linear structural model display of path analysis, TQM strategies are useful for enhancing teaching quality and increasing students' learning satisfaction and loyalty. This research will effectively promote the management models of universities to enhance their teaching qualities, research, services and counselling; thus, enabling them to seize the competitive advantage and ensure the important enlightenment and contribution of sustainable business.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The Cognition, Implementation and Effects of TQM on Eastern and Western Worlds

Education reform is an issue of worldwide concern. The introduction of the corporate management philosophy known as TQM in the area of school management and teaching efficiency is expected to provide students with a higher quality of education.

Eastern World - Taiwan

Taiwan's focus on quality management dates back to the establishment of the Chinese Society for Quality in 1964. It was not until after the 1980s, when scholars from the National Chung-Shan Institute of Science and Technology and

certain companies advocated in favour of the concept of TQM that it gradually became valued by the community. The National Quality Award was formally established in 1990 and it has become the highest honour for quality.

With the rapid expansion of higher education institutions in Taiwan's booming economy, two common issues that higher education institutions' leaders face are survival and development. One of the best strategies to address these issues is to introduce quality management concepts and practices, and to learn from other industries. With the introduction of TQM concepts and practices in the education sector, new ideas should first be established and the work of Drucker should be accepted, which means that the mission and purpose of every enterprise should be to meet customers' expectations [13].

In light of the rapidly changing conditions of global industry, Taiwan's future development and services are progressing at an accelerated rate. Schools are developing innovative curricula, recruiting professional teachers, training skilled personnel and undergoing academic upgrades in order to strengthen their survival status. In addition, the enhancing of students' self-awareness shows that higher education institutions are facing an unprecedented change. In the face of these changes, the best way to cope is to enhance the quality of teaching.

As the reform continues, attention should be paid to the quality of teaching. The instructional design process should be re-engineered through the school culture and all members of the school should participate. TQM will be an aide to teaching and will have an impact on students' learning [6]. For example, Tamkang University, which has previously been conferred the *National Quality Award*, has pioneered the *Tamkang Quality Award*. The University has been giving this award to those units within the University that have been implementing TQM with the best outcomes in creating a *teaching quality assurance system* that follows quality policies, objectives, procedures, and audit and assessment, among other factors, through systematic efforts to improve the quality of higher education; thus, forging a number of excellent results and earning affirmation and respect in the community.

Western World - the United States of America

Through continuous revisions, innovation and promotion of TQM by America's quality master Deming and his colleagues, there has been outstanding application of TQM in the business sector [14]. The belief that *...quality begins with education and ends with education...* has brought about enthusiastic discussion among scholars in the education sector in the hope of establishing comprehensive quality education [15]. Therefore, the United States established the *National Quality Award* (NQA) in 1987 with TQM as the core axis. In 1990, the education sectors in the United Kingdom and the United States saw the rising importance of TQM. Not only did these countries study the applicability of TQM in higher education, but they also extended its operation and application to all levels of school management, enabling school development to reach new heights; thus, enhancing the quality of teaching and fostering students with well-rounded talent needed in society.

The emphasis of TQM is not about status and control, but teamwork and empowerment. The most important aspect of TQM is to provide better customer service and this has become the most effective way to deal with the most recent practical problems [16]. TQM's concept of continual improvement can provide any education institution with a series of practical tools to meet and exceed the current and future needs and expectations of customers [17]. Between 1991 and 1992, the number of universities that had adopted TQM increased to 150. By 1993, there was no university that did not advocate the implementation of TQM. TQM in higher education has had a positive effect in how, for example, there was a certain degree of upgrading and improvement in teachers' and students' satisfaction with the school, school reputation and campus culture.

Total Quality Management (TQM), Teaching Quality and Learning Satisfaction

TQM is a set of management philosophies that assist organisations' understanding of students' needs and participation in course design improvement [18-20]. In the late 1980s, academia in the United States began to work towards the pursuit of quality, and many higher education institutions introduced TQM as an approach to enhance the school's operating performance [3]. TQM is considered especially useful for application in educational institutions [21], because it can help to resolve the challenges faced in an intensely competitive environment [8], integrate a variety of educational reforms, enhance the effectiveness of the schools' business management and improve the teaching quality of higher education [3].

Teaching quality is the ultimate efficacy of teacher's overall teaching activities. As a member of the school, the teacher is an important human asset, which coordinates the objectives and course workflow processes of the school management and provides teaching quality with which students are satisfied; thereby, influencing the students' learning efficacy [22][23]. As the gradual transformation of evaluation practices of higher education aims to emphasise students' learning efficacy, excellent teaching quality has become the key strategy of higher education institutions and the focal point of each country's higher education reforms. Learning satisfaction generates pleasant feelings or attitudes in learners towards the learning activities [24]. The satisfaction factors of student learning include teaching quality, social and psychological satisfaction, and interactions in between teachers and peers [25].

The most important parts of quality management are for each higher education institution to focus on performance accountability, quality assurance and quality enhancement. TQM is used by many universities to inspect teaching quality, emphasise the core values of customer focus [19], and support the use of student satisfaction surveys to measure the indices of teaching quality [26]. *Using process reengineering as a core problem of teaching design to create learning value, highlighted that applying TQM to develop the value-chain instruction system design (VCISD) will obtain higher student satisfaction* [6]. So, using TQM to reengineer teaching processes will improve teaching quality and students' satisfaction [7]. Thus, the authors posit Hypothesis 1:

H1: Teaching quality has a mediating effect on the relationship between TQM strategies and learning satisfaction.

TQM, Teaching Quality and Student Loyalty

Loyalty describes customers' repeat purchases, promises to introduce the company's related products or services to families and friends, and the willingness to help improve a company's services [27]. Quality is not only the core concept of school education reform, but it is also the basic goal. A school that ignores *quality* in its reform is *invalid* [28]; however, TQM has practical value on education quality improvement [29] and the most important procedure in the TQM model is 100% satisfaction [30].

In recent years, schools have been influenced by a declining birth rates. For schools pursuing the popularisation of quality management [31], the students and parents are not only concerned with the level of tuition fees, but also the measure of teaching quality [32]. TQM and the assurance of students' learning quality enhance students' learning motivation and commitment [4]. Students experience a complex and developmental journey when choosing a school [33][34]. Therefore, when the comparative values among the students' expectation, investment and benefits obtained in the school are high [35], their satisfaction and loyalty will increase, and the school will attract future students [36-40]. Thus, the authors infer Hypothesis 2:

H2: Teaching quality has a mediating effect on the relationship between TQM strategies and student loyalty.

Figure 1 shows the relationship described by Hypothesis 1 and Hypothesis 2.

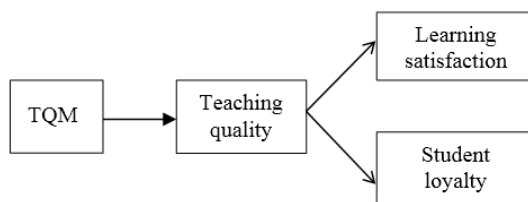


Figure 1: Research framework chart.

RESEARCH DESIGN

This research study mainly used a questionnaire survey method as the measurement tool; a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) has been used as the method of measurement for each dimension. Regarding the selected dimensions, SPSS12.0 was adopted to conduct questionnaire pre-test and descriptive statistical analysis, while LISREL8.70 statistical software was used to validate the relationship of influence between each dimension.

RESEARCH OBJECT

Tamkang University was the first university to implement TQM in Taiwan. It has been in first place as the favourite private university of enterprises for 18 years, as rated by Cheers magazine. As the College of Business and Management has the most students of all the colleges at Tamkang University, students from the College of Business and Management were invited to explore the influences of implementing TQM strategies in school organisations on the teaching quality and on students' learning satisfaction and loyalty.

Of the 1,500 questionnaires distributed to the students in the College, 1,060 completed questionnaires were received (comprising 994 copies of effective questionnaires and 116 copies of ineffective questionnaires), giving an effective recovery rate of 89.06%, which comprised 344 male (36.44%) and 600 female (63.56%) students.

RESEARCH SCALE

TQM, teaching quality, learning satisfaction and students' loyalty scales are from the following research [13][27][41-48]. Aside from the χ^2 value being significantly affected by the number of samples [49], the remaining results indicate fit indices (as shown in Table 1 and see Appendix 1 for the descriptions and formulae).

EMPIRICAL RESULTS AND ANALYSIS

Descriptive Statistics

Regarding the analysis result of TQM strategy, teaching quality, learning satisfaction and students' loyalty through SPSS12.0, the mean of the TQM strategies was 3.4394 (SD = 0.58838); the mean of teaching quality was 3.5790 (SD = 0.58986); the mean of learning satisfaction was 3.5131 (SD = 0.65495); and the mean of students' loyalty was 3.3704 (SD = 0.84216) (Table 2).

The Mediation Effect of Teaching Quality

This research study aimed to explore whether teaching quality has a mediating effect on the influence of TQM strategies on student learning satisfaction and loyalty. To detect the presence of this mediating effect, it is necessary to detect whether two direct effects exist; that is 1) whether significant direct effects of TQM exist between student satisfaction and student loyalty; and 2) whether significant direct effects of teaching quality exist between student satisfaction and student loyalty. As a prerequisite, when these two direct effects both present significant relationships, the mediating effect of teaching quality is likely to exist; thus, in this article, the authors investigate the relationships based on this sequence, as described below.

Fit Indices Test of Each Hypothesis

LISREL 8.70 was used to analyse the fit model of indices for Hypothesis 1 and Hypothesis 2, such as SRMR. As shown in Table 3, the accepted values of the indices all are within the satisfactory range.

Table 1: Each scale fit index.

Index	Accept value	TQM	Teaching quality	Learning satisfaction	Student loyalty
Chi-square(χ^2)	-	578.73	553.37	0.00	0.00
Degrees of freedom	-	114	180	0	0
SRMR	<0.05	0.037	0.026	0.000	0.000
RMSEA	<0.05	0.066	0.047	0.000	0.000
GFI	≥ 0.90	0.93	0.95	1.00	1.00
CFI	≥ 0.90	0.99	0.99	1.00	1.00
NNFI	≥ 0.90	0.98	0.99	1.00	1.00
PNFI	≥ 0.50	0.82	0.85	1.00	1.00
PGFI	≥ 0.50	0.69	0.74	1.00	1.00

Table 2: Descriptive statistics of variables.

Variable	M	SD	1	2	3	4
1. TQM	3.4394	0.58838	1.00			
2. Teaching quality	3.5790	0.58986	0.736**	1.00		
3. Learning satisfaction	3.5131	0.65495	0.636**	0.732**	1.00	
4. Student loyalty	3.3704	0.84216	0.550**	0.545**	0.506**	1.00

Note: * $p < 0.05$, ** $p < 0.01$, $n = 944$

Direct Effect

Through LISREL 8.70 analysis, it was found that the direct effect coefficient of TQM strategies on teaching quality is 0.78 ($p < 0.01$); the direct effect coefficients of TQM strategies on student learning satisfaction and loyalty are 0.76 ($p < 0.01$) and 0.60 ($p < 0.01$), respectively; the direct effect coefficients of teaching quality on student learning satisfaction and loyalty are 0.87 ($p < 0.01$) and 0.59 ($p < 0.01$), respectively. The results, thus, showed significant and direct effects, indicating that the teaching quality has a mediating effect (as shown in Figure 2 and Table 4 and Table 5).

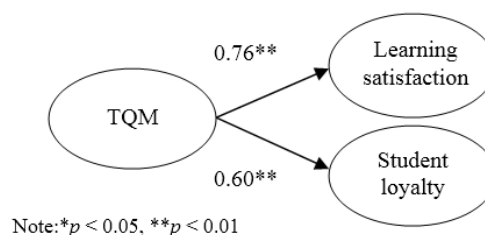


Figure 2: TQM strategies direct impact on learning satisfaction and student loyalty.

Verification Results of Research Hypotheses

This research has proved that the influence of TQM strategies through teaching quality possess positively significant and direct effects on student learning satisfaction and loyalty ($\gamma = 0.69, p < 0.01, \gamma = 0.48, p < 0.01$); thus, supporting Hypothesis 1 and Hypothesis 2 (Table 6).

Table 3: Fit indices of each hypothesis.

Index	Accept value	H1	H2
Chi-square(χ^2)	-	2167.95	2235.77
Degrees of freedom	-	763	724
SRMR	< 0.05	0.034	0.039
RMSEA	< 0.09	0.044	0.047
GFI	≥ 0.90	0.90	0.89
CFI	≥ 0.90	0.99	0.99
NNFI	≥ 0.90	0.99	0.99
PNFI	≥ 0.50	0.92	0.91
PGFI	≥ 0.50	0.80	0.79

Table 4: Determination results on the mediating effect of teaching quality on learning satisfaction.

	Direct effect	<i>t</i> -value	Mediating effect	<i>t</i> -value
TQM strategies → Teaching quality	0.78	20.23**	0.69	17.03**
Teaching quality → Learning satisfaction	0.87	18.30**		

Note: * $p < 0.05$, ** $p < 0.01$

Table 5: Determination results on the mediating effect of teaching quality on student loyalty.

	Direct effect	<i>t</i> -value	Mediating effect	<i>t</i> -value
TQM strategies → Teaching quality	0.78	20.15**	0.48	14.82**
Teaching quality → Students' loyalty	0.59	15.61**		

Note: * $p < 0.05$, ** $p < 0.01$

Table 6: Verification results of research hypotheses.

Research hypothesis	Variable relationship	Standardised coefficient	<i>t</i> -value	Verification results
H1	TQM strategies → Teaching quality → Learning satisfaction	0.69	17.03**	Supported
H2	TQM strategies → Teaching quality → Students' loyalty	0.48	14.82**	Supported

Note: * $p < .05$, ** $p < .01$

CONCLUSIONS

Based on the path analysis results, as predicted, the hypotheses possess positively significant relationships. It is, therefore, beneficial for Tamkang University to implement TQM strategies to improve the teaching quality and the students' learning satisfaction and loyalty. This finding coincides with Bergquist et al's argument that using TQM on educational institutions is particularly useful [21].

The direct effect coefficients of TQM strategies on learning satisfaction and students' loyalty were 0.76 and 0.60, respectively; whereas the direct effect coefficients of teaching quality on learning satisfaction and students' loyalty were 0.87 and 0.59, respectively; and the mediating effect coefficients were 0.69 ($p < 0.01$) and 0.48 ($p < 0.01$), respectively. As indicated, the teaching quality has a mediating effect on students' learning satisfaction and loyalty. This finding is also consistent with past research results [50-52].

MANAGEMENT IMPLICATIONS AND RECOMMENDATIONS

In recent years, owing to the rapid expansion in the number of universities, higher education has been downgraded from elite education into oversupply education, leading to concerns about the decline in higher education quality [2]. To improve the overall teaching quality and enhance students' learning satisfaction and loyalty, TQM strategies have become important approaches [3-7]. Although the goal of the schools is not to receive profits, like enterprise organisations, schooling is also a business [53][54]. Therefore, TQM strategies can be used to enhance the effectiveness

of the schools' business and management by implementing educational reforms, which allow the school to reach its maximum effectiveness [55].

In countries that pay attention to the development of university education to strengthen the competitiveness of students entering the job market, teaching quality enhancement has become the most valued part of education reform policy implementation. As current education is highly competitive, students evaluate the conditions offered by the school and balance their expectations with their abilities to decide whether to take several years building a long-term relationship. Thus, school education must continue to be a single product (education), with many features (courses), excellent research and applications, and interest in providing customer services (e.g. technology development, career preparation), and it should correspond with society's quality assurance and recognition, while standing out from the products of other schools.

Since marketing management of education has received increased attention in recent years [56], all colleges and universities in Taiwan should not only introduce TQM strategies, but they should also establish their school characteristics, effectively grasp the marketing focus, and resolve the marketing obstacles to cope with rapid social transition and the impact of the low birth rate, thus reducing the pressure from the enrolment of new students.

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APPENDIX 1

The authors adopted Chou’s measurement standards, which are absolute fit measures, comparative fit measures, and parsimonious fit measures [57].

Measurement standard	Description	Measurement formula
I. Absolute fit measures		
1. Goodness-of-fit index (GFI)	GFI is based on the square of the deviation of observable variables; the index should be equal to or greater than 0.90. The GFI describes the ratio between the variance and covariance of the explainable observable data in the hypothesised model.	$GFI = \frac{tr(\hat{\sigma}' W \hat{\sigma})}{tr(s' W s)}$ <p>With the numerator calculated as the weighted covariance sum from the variance of the hypothesised model. The denominator is the weighted average sum of the covariance obtained from actual observed variables. W is the weighted matrix.</p>
2. Standardised root mean square residual (SRMR)	The simplest fit index provided by LISREL is RMSR, while SRMR is the standardised RMSR.	
3. Root mean square error of approximation (RMSEA)	This index is based on residual analysis results evaluation. The smaller the value, the more it represents a good fit between the model and the data. The RMSEA coefficient is not influenced by sample size and model complexity.	$estimated_RMSAEA = \sqrt{\frac{\hat{F}_0}{df_{test}}}$ <p>with $\hat{F}_0 = \frac{\chi^2_{test} - df_{test}}{N}$, χ^2_{test} as the chi-square test value, df_{test} as the degrees of freedom, and N as the sample number.</p>
II. Comparative fit measures		
1. Non-normed fit index (NNFI)	The logic behind NNFI and NFI is similar: a value equal to or greater than 0.90 represents a good fit. When the sample size is small and when the degree of freedom is large, using NFI to test for fit will result in underestimation. Therefore, this index takes into consideration the effect of degree of freedom in order to avoid the effects of model complexity.	$NNFI = \frac{\chi^2_{indep} - \frac{df_{indep}}{df_{test}} \cdot \chi^2_{test}}{\chi^2_{indep} - df_{indep}}$
2. Comparative fit index (CFI)	Uses a non-centralised chi-square distribution CFI; a value equal to or greater than 0.90 represents a good fit. CFI describes the degree of improvement between the model and the independent model. The CFI is most suitable for data with a small sample size.	$CFI = 1 - \left[\frac{\chi^2_{model} - df_{model}}{\chi^2_{indep} - df_{indep}} \right]$
III. Parsimonious fit measures		
1. Parsimonious normed fit index (PNFI)	In an effort to simplify models, proposed an NFI-based corrected index. PNFI values equal to or greater than 0.50 represent a good fit.	$PNFI = \left(\frac{df_{model}}{df_{indep}} \right) NFI$
2. Parsimonious goodness-of-fit index (PGFI)	The PGFI is another form of the GFI; values should be equal to or greater than 0.50. PGFI takes into consideration the number of estimated parameters in the model; it can be used to reflect the degree of parsimony in the hypothesised model in SEM (degree of parsimony).	$PGFI = \left[1 - \left(\frac{\text{Number of estimated parameters in model}}{\text{Number of observations}} \right) \right] GFI$